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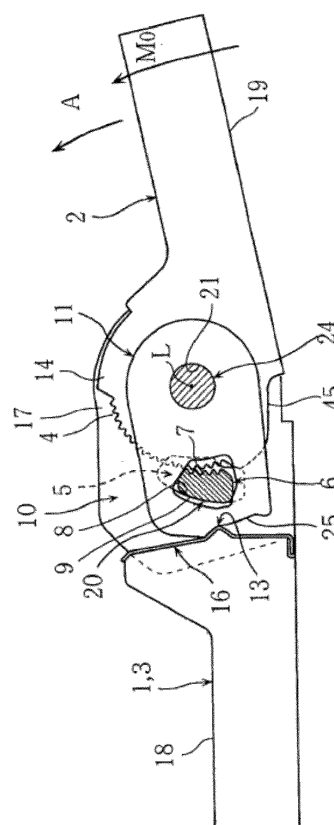
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(54) **ANGULAR ADJUSTMENT TOOL AND SOFA**

(57) **PURPOSE:** The provision of an angular adjustment tool reducing the generation of so-called metallic noise in tandem with the swinging motion.

SOLUTION MEANS: An angular adjustment tool which is equipped with a first member 1, and a second member 2 having the gear means 4, and a floating wedge member 6 having the toothed surface 7 which can mesh with the gear means 4 and which is pivotally attached in a swingable manner, and enabling a relative swinging motion of the second member 2 to one direction A with respect to the first member 1, and constraining the relative swinging motion to the other direction (B). In particular, there is a non-contact free holding means provided holding the surface 7 of the floating wedge member 6 and the gear means 4 in a non-contacted free state on the occasion of the swinging motion to one direction A.

Figure 2



DescriptionTECHNICAL FIELD:

[0001] 0001 The present invention relates to an angular adjustment tool and sofa.

Prior art technology

[0002] 0002 Conventionally there have been proposals for an angular adjustment tool which can swing a first member/second member relative to one direction, and which regulates the relative swinging of the first member/second member to another direction by means of a wedge effect of a floating wedge member (Refer to patent reference 1).

Prior Art referencesPatent references

[0003] 0003 Patent reference 1: Japanese patent number 5514753

Outline of the patentProblems to be solved by the invention

[0004] 0004 However, in the angular adjustment tool of patent reference 1, the floating wedge member is pressed all the time on a gear member by means of the bias of the spring back force of a spring back leaf spring member. For this reason, when the second member is swung in one direction with respect to the first member, and the floating wedge member rides over the gear means, the toothed surface of the floating wedge means crashes into the gear means, generating a metallic noise. For example, the sofa represented in figure 10 of this patent application has the headrest means 48 attached to the upper edge of the back means 46 by means of an angular adjustment tool 3. Then, on the occasion of adjusting the inclined angle of the headrest means 48, when there is a metallic noise generated from the angular adjustment tool at the ear of the person seated on the seat means 47, there is the disadvantage that it is harsh on the ears.

Moreover, even in the case of chairs, (foldable type) beds and the like, the same applies. When the back part or the headrest means or the inclined base means and the like is erected upright/subject to an inclination, or the angle of inclination of an inclined bed means is adjusted, when there is the generation of a harsh metallic noise from the angular adjustment tool which axially supports the swingable motion thereof, there is also the problem of it being harsh on the ears.

[0005] 0005 In that respect, the present invention has as its object the provision of an angular adjustment tool reducing the metallic noise generated associated with

the swinging motion.

Moreover, another object of the invention is the provision of a sofa performing angular adjustment of the headrest means without generating a grating noise on the ears at the ears of the seated persons thereon.

Summary of the invention

[0006] 0006 In respect of an angular adjustment tool of the present invention equipped with a first member, and a second member having a gear means axially supported in a swingable manner, and a wedge member having a toothed surface which can mesh with said gear means, and said second member can be swung in one direction (A) relative to and in respect of said first member, and is restricted from relative swinging motion to the other direction (B),

A non-contacted free-holding means is provided holding said toothed surface of said floating wedge member and said gear member freely in non-contact on the occasion of the swinging motion to said first direction (A).

[0007] 0007 Moreover, said non-contacted free-holding means provides a wedge operating member revolved through a small angular range by means of the friction force accompanying the revolution with said second member, and by means of the swinging motion to said one direction (A) of said second member with respect to said first member, said wedge operating member causes said toothed surface of said floating wedge member to be non-contacted with said gear means in a freely non-contacted state, and in addition, a configuration by means of the swinging in said small angular degree to said other direction (B), said floating wedge member is pressed in between the wedge surface formed in said first member side, and said gear means, in a configuration with the meshed state of said toothed surface of said floating wedge member with said gear means, wherein the relative swinging of said second member to said other direction (B) in respect of said first member is constrained by means of the wedge action of said floating wedge member.

[0008] 0008 Then, said non-contact free-holding means may provide a wedge operating member revolved in a preferably small angular range by means of the friction forces on being revolved with said second member, and by swinging said second member in said first direction (A) in respect of said first member, said wedge operating member holds said toothed surface of said floating wedge member in a noncontacted free state freely non-contacted with respect to said gear means, in addition, a configuration wherein by means of said swinging in a small angular range to said other direction (B), said floating wedge member may be pushed between the wedge surface formed on said first member side, and said gear means, in the meshed state of said toothed surface of said floating wedge member and said gear means, and by means of the wedge effect of said floating wedge member, the relative swinging of said second

member to said other direction (B) with respect to said first member may be constrained.

[0009] 0009 In addition, said wedge operating member may have a sliding means generating said frictional force accompanying the sliding revolution thereof on said second member.

[0010] 0010 Moreover, the sofa of the present invention wherein the headrest means is attached via said angular adjustment tool on the upper edge of the back means, and enabling the gradual swinging of said headrest means to the upright direction (A) and constraining the swinging motion to the inclined direction (B), The configuration is one wherein said angular adjustment tool is equipped with a gear means, and a small gear member for use in regulation having a toothed surface enabling meshing with said gear means, and on the occasion that said headrest means is swung in said upright direction (A), not only are said gear means of said angular adjustment tool and said toothed surface are caused to be in a non-contacted free state, in addition, said gear means of said angular adjustment tool and said toothed surface are caused to be in a meshed state by means of the pullback action to a specific small angle in the inclined direction (B), in a configuration so as to hold the posture of said headrest.

Effects of the invention

[0011] 0011 By means of the angular adjustment tool of the present invention, by means of the meshing of the toothed surface of the floating wedge member with the gear means, enables the static desired angle of the first member/second member securely without slippage. Then on the occasion of the angular adjustment of the first member/second member, the non-contacted free state holding the toothed surface of the floating wedge member free and not in contact with the gear means is enabled, enables silent swinging. In other words, the prevention of the generation of a metallic noise generated by the impact of the floating wedge member on the gear means is enabled.

[0012] 0012 Furthermore, by means of the sofa of the present invention, the prevention of the generation of noise which is harsh on the ears at the ears of the person seated on the seating means is enabled, and a quiet swinging motion of the headrest means is enabled.

Brief description of the drawings

[0013] 0013

Figure 1: A cross section side surface drawing representing the first embodiment of the angular adjustment tool of the present invention.

Figure 2: A cross section side surface drawing representing the first embodiment of the angular adjustment tool of the present invention.

Figure 3: A cross section side surface drawing representing the first embodiment of the angular adjustment tool of the present invention.

Figure 4: A cross section side surface drawing representing the first embodiment of the angular adjustment tool of the present invention.

Figure 5: A cross section side surface drawing representing the first embodiment of the angular adjustment tool of the present invention.

Figure 6: A cross section side surface drawing representing the first embodiment of the angular adjustment tool of the present invention.

Figure 7: An exploded side surface drawing of the wedge operating member.

Figure 8: An exploded cross-section surface side drawing of the main parts.

Figure 9: A cross section drawing at C - C in figure 7.

Figure 10: A perspective drawing representing the sofa of the present invention.

Figure 11: An exploded side surface drawing of another wedge operating member.

Figure 12: An exploded perspective view looking at the main parts of the wedge operating member from the inner surface side.

Figure 13: A cross section drawing at D - D in figure 11.

Figure 14: A perspective drawing representing the second embodiment of the angular adjustment tool of the present invention.

Figure 15: An exploded perspective view of the second embodiment.

Figure 16: An exploded perspective view of the second embodiment as seen from a different angle.

Figure 17: A perspective view of the opposite surface wall means of the second embodiment.

Figure 18: A perspective view representing the floating wedge member of the second embodiment.

Figure 19: A perspective view representing the wedge operating member of the second embodiment.

Figure 20: An elevated view representing the wedge

operating member of the second embodiment.

Figure 21: A perspective view representing another wedge operating member embodiment.

Figure 22: An elevated view representing another wedge operating member embodiment.

Figure 23: A partially exploded perspective view of the second embodiment in the cover removed state.

Figure 24: A partially exploded perspective view representing the state wherein the opposite surface wall is removed from Figure 23.

Figure 25: An elevated view representing the assembled state of all the constituent parts.

Figure 26: A vertical cross section drawing of the second embodiment.

Figure 27: A partial horizontal cross section drawing of the second embodiment.

Figure 28: A cross section side surface drawing in order to explain the operating method of the second embodiment.

Figure 29: A cross section side surface drawing in order to explain the operating method in continuity with Figure 28.

Figure 30: A cross section side surface drawing in order to explain the operating method in continuity with Figure 29.

Figure 31: A cross section side surface drawing in order to explain the operating method in continuity with Figure 30.

Figure 32: A cross section side surface drawing in order to explain the operating method in continuity with Figure 31.

Best mode of embodying the invention

[0014] 0014 Hereafter, the present invention is explained in detail based on the figures representing the embodiments.

As illustrated in figure 1, the angular adjustment tool 3 of the this embodiment disposes of the first member 1, and second member 2 having the gear means 4, and the floating wedge member 6 having a toothed surface 7 which enables meshing with the gear means 4. Then the first member 1 and the second member 2 are assembled in a manner enabling swinging about the center of an axis L by means of pivotally connected axis 24.

[0015] 0015 The angular adjustment tool 3 of the

present invention can be adapted to sofas, chairs, (inclinal style) beds and the like. More specifically, it may be adapted to the freely swingable pivot means of erectable/inclinable headrest means, back means, inclinable bed means and the like. As far as previously or later in this text is referred to a sofa, this means at once that it can be also any of the other mentioned devices such as a chair, a bed etc. or even the freely swingable pivot means of ... as mentioned before.

[0016] 0016 The wedge member 6 has the surface 7 on one side surface, and has the contact surface 9 on the other side surface. Said contact surface 9 contacts preferably with a wedge surface formed preferably on the side of the first member 1. As illustrated in figure 1, the floating wedge member 6 not only has contact surface 9 contacting e.g. with the wedge surface 8, in the meshed state are also meshing the toothed surface 7 and the gear means 4, whereby the second member 2 is prevented from having a swinging motion in the direction of arrow B in the figure in respect of the first member 1.

[0017] 0017 The first member 1 has preferably the attachment means 18 integrated, e.g. with a pair of mutually facing wall means 17 and 17. Not only is the pivotally connected axis 24 inserted through the mutually facing wall means 17 and 17, also preferably a wedge-shaped window means 5 is formed therein. The wedge-shaped window means 5 has preferably an arch shaped wedge surface 8, and preferably a refuge space 15 in order to store the separated state of the floating wedge member 6 from the gear means 4. The wedge-shaped window means 5 is formed so that the wedge surface 8 gradually approaches the gear means 4. For this reason, a wedge shaped space which shrinks in the clockwise direction is formed in the side surface view of Figure 1 by means of the wedge surface 8 and the outer peripheral toothed surface of the gear means 4, and the floating wedge member 6 is disposed in a freely displaceable manner in this wedge shaped space.

[0018] 0018 The second member 2 integrates the preferably two panels of the gear panel means 45 and 45 with the attachment means 19. Then the mutually parallel gear means 4 and 4 are inserted between the two opposing walls of the first member 1. They are formed so as to [revolve], for example, in an angular range of 100° ~ 120° around the center angle on the arc shaped outer peripheral edge means of the gear panel means 45 and 45. Then, said toothed surface 7 and the gear means 4 are not only engaged at two locations in the left-right horizontal direction, all of teeth of the toothed surface 7 mesh simultaneously with the gear means 4. The protruding means 14 and 14 are disposed at the initial terminal means and the final terminal means of the gear means 4. The pivotally connected axis 24 is inserted to the gear panel means 45 and 45. Now, the toothed surface 7 of the floating wedge member 6 may have 13 ~ 20 teeth formed therein. Moreover, the gear means 4 may have 40 or more teeth, more preferably 45 ~ 65 teeth formed therein. In this manner the angular adjustment means

has 40 stages or more stages enabled therein.

[0019] 0019 As illustrated in figure 2, the swinging motion of the second member 2 in the (relative) direction of the arrow A in the figure is enabled with respect to the first member 1. On the occasion of the swinging motion of the second member 2 in that direction A, the floating wedge member 6 is provided with the non-contact free-holding means 10 holding it free in non-contact with the gear means 4.

[0020] 0020 The non-contact free-holding means 10 provides the wedge operating member 11 (operating plate) revolved in a small angular range about the axial center L, by means of the frictional force accompanied by the revolving of the second member 2.

The wedge operating member 11 has a hole means 21 through which the pivotally connected axis 24 is inserted. In the state in which the wedge operating member 11 is inserted between the gear panel means 45 and 45, the first member 1/the second member 2 are pivotally integrated via the pivotally connected axis 24.

As illustrated in figure 7, the aperture window means 20 holding the floating wedge member 6 in a freely displaceable manner is formed on the wedge operating member 11. The aperture window means 20 has an arched surface 22 on the outer side as seen from the center point (axial center L) of the hole means 21, and has preferably a tapered surface 23 forming an acute angle Φ , see e.g. fig. 7, with one terminal edge of the arched surface 22. The recessed means 25 is preferably formed on the outer side surface of the wedge operating member 11.

[0021] 0021 In figures 1 ~ 6, a spring means, preferably a leaf spring member 16 is provided between the first member 1 and the wedge operating member 11. As far as in the following is mentioned a leaf spring means or member it can always be replaced by spring means. The leaf spring member 16 has a protrusion means 13 in the long direction intermediate part thereof, and both terminal means of the long direction are supported by the first member 1. The leaf spring member 16 is disposed so as to have the protrusion means 13 opposite to the recessed means 25 of the wedge operating member 11. For this purpose, as illustrated in figures 1 and 2, the protrusion means 13 slides continuously in the recessed means 25 so as to enable the wedge operating member 11 to be revolved, dragged by means of the friction forces on the second member 2. On the other hand, as illustrated in figures 4 and 5, in the state wherein the protrusion means 13 is separated from the recessed means 25 and is pressed to the outer side surface of the wedge operating member 11, the wedge operating member 11 is locked so as not to be revolved by means of the friction forces drag of the second member 2.

[0022] 0022 As illustrated in figures 7 and 9, wedge operating member 11 has the rubbing contact means 12 generating a drag-around friction force on rubbing the second member 2.

The wedge operating member 11 does preferably consist of two side wall means 27 and 27 in the said side wall

means 27 and 27 are further preferably connected by means of the connection means 28 to a pair of side wall means 27 and 27. The rubbing contact means 12 forms e.g. a protruding shape (swelled-out shape) on the outer side of one or both the side wall means 27 and 27 of the wedge operating member 11. The rubbing contact means 12 forms preferably a tongue shape 29 cut-out e.g. in a reverse-C shape from the side wall means 27 and 27, and this tongue shape 29 is preferably formed so as to be curved upwards in a leaf spring shape (Figure 9). Alternatively, a preferably parallel pair of slits may be formed, and the inner side of the slits may have a triangular mound shape protuberance thereon (not illustrated in the figures). When the plural rubbing contact means 12 are pressed to the inner surface of the gear panel means 45 and 45 of the second member 2 generating a dragging friction force, the wedge operating member 11 is revolved in tandem with the second member 2 by means of this dragging friction force.

[0023] 0023 As illustrated in figures 11 ~ 13, the wave shaped outer annular means 32 may provide intermittent (plural) arc shaped slits remaindered in of the peripheral edge of the holding means 21 may be provided on the wedge shaped operating member 11.

As illustrated in figures 12 and 13, the wave shaped outer annular means 32 may be cut out by means of the (plural) arched shaped slits 35 intermittently remaindering the connection remaining means 30 of the side wall means 27, and plural protuberances 33 may be formed by means e.g. of the bay curvature of the arc shaped slits to the inner side. The wave shaped inner annular means 31 may be cut out by means of the intermittent (plural) arched slit 39 remaindered in the connection means 38 of the protuberance means 33, and plural rubbing contact means 12 are formed in outwardly projecting shapes swelled-up in projections on the inner side of the slits 39. The wave shaped inner annular means 31 and the wave shaped outer annular means 32 may be elastically deformed. As a result, the elastic deformation of the rubbing contact means 12 generate an appropriate drag-around friction force by being elastically pressure contacted with the inner surface of the gear panel means 45 and 45 of the second member 2. Thus, the wedge operating member 11 is revolved in tandem with the second member 2 by means of this drag-around friction force.

[0024] 0024 The operating method (effects) of the angle adjustment tool of the present invention described above is explained hereafter.

As illustrated in figures 1 and 2, the folding operation M_0 is performed swinging the second member 2 in the direction of arrow A with respect to the first member 1. As a result, the wedge operating member 11 is revolved in tandem (counterclockwise in the figure) with the second member 2 by means of the drag-around friction force. Thus the floating wedge member 6 is displaced to the upper terminal surface of the tapered surface 23 of the wedge operating member 11.

As a result, while the floating wedge member 6 is dis-

placed to the lower direction in the wedge shaped window means 5 (the wedge shape), and swivels on contact with the inclined induction surface 26 of the wedge shaped window means 5, and is slightly displaced in the direction of separation from the gear means 4. The floating wedge member 6 is disposed leaning on the wedge surface 8 by the lower means of the wedge shaped window means 5 (the wedge-shaped space). As a result, a minute gap is generated between the toothed surface 7 and the gear means 4, causing a non-contact free state (refer to figure 8). In the non-contacted free state, the floating wedge member 6 and the gear means 4 are not in contact, and the second member 2 is swung quietly in the direction A, without generating a sound. The floating wedge member 6 is held by means of the tapered surface 23 of the wedge operating member 11 and the induction gradient surface 26 of the wedge-shaped window means 5 and the wedge surface 8 and held in a preferably substantially fan-shaped space. As long as there is the generation of the drag-around friction force of the second member 2 on the wedge operating member 11, the floating wedge member 6 is pressed from the upper side by the wedge operating member 11, and does not mesh with the gear means 4.

In other words, while operating the folding operation M_0 , the floating wedge member 6 is held without causing a metallic noise, and the toothed surface 7 of the floating wedge member 6 and the gear means 4 are held in the non-contacted free state.

[0025] 0025 Next, as illustrated in figure 3, during the folding operation M_0 , with the pullback operation M_1 causing a swinging motion to the direction of arrow B of the second member 2 with respect to the first member 1, the wedge operating member 11 is revolved in tandem with the second member 2 by means of the drag-around friction force (clockwise in the figure). The wedge operating member 11 pushes up the lower terminal surface from the underside of the floating wedge member 6 and the floating wedge member 6 is displaced to the upper part of the wedge-shaped window means 5 (wedge-shaped space), causing the meshed state of the toothed surface 7 of the floating wedge member 6 and the gear means 4. The floating wedge member 6 is progressively pushed into the narrowing space between the wedge surface 8 and the gear means 4, constraining the swinging motion of the second member 2 to the direction B by means of the wedge effect, sustaining the inclined angle of the first member 1 and the second member 2 (holding in a fixed state).

In the meshed state represented in figure 3, by the meshing of the toothed surface 7 of the floating wedge member 6 with the gear means 4, the secure holding and fixation of the inclined angle of the first member 1 on the second member 2 without slippage thereof is enabled.

[0026] 0026 Then, as illustrated in figure 4, when the second member 2 is swiveled further in the direction A by means of the folding operation M_0 , enabling the final folded position P_0 in the upright state. By this means,

while the upright means 14 is pressed to the upper terminal surface of the floating wedge member 6, the floating wedge member 6 is displaced to the refuge space 15 of the lower means of the wedge-shaped window means 5 (the wedge-shaped space). On this occasion, the wedge operating member 11 is pressed to the lower terminal surface of the floating wedge member 6, and is revolved further from the non-contact free state of figure 2 (anti-clockwise in the figure). This is called the retrieved state. In the retrieved state, the floating wedge member 6 is stored in the refuge space 15, in addition to, the revolution of the wedge operating member 11 being ligated by means of the protrusion means 13 of the leaf spring member 16. Therefore, even if the second member 2 is swiveled to the direction B, the wedge operating member 11 does not revolve in tandem because of the ligation of the spring member 16. As a result, the mesh released status of the gear means 4 and the toothed surface 7 is maintained, and the second member 2 can be swiveled in the direction B with respect to the first member 1.

[0027] 0027 Next, as illustrated in figure 5, when the second member 2 is subject to a swiveled motion in the direction B by means of the deployment operation M_2 , and immediately before assuming the final deployed position P_1 (Refer to figure 6), the second member 2 becomes linear with respect to the first member 1, the protrusion means 14 of the other direction contacts with the lower terminal surface of the floating wedge member 6. Then, as illustrated in figures 5 and 6, when the second member 2 is pressed slightly strongly in the direction of B, the protrusion means 14 is pressed to the lower terminal surface of the floating wedge member 6, and the floating wedge member 6 is displaced so as to be pushed out to the upper direction from the refuge space 15. On this occasion, in tandem with the displacement of the floating wedge member 6, because the upper terminal surface of the floating wedge member 6 is pushed up to the tapered surface 23 of the wedge operating member 11, and the wedge operating member 11 is revolved clockwise in the diagram. The wedge operating member 11 is released from the ligated state by means of the leaf spring member 16, and revolves in tandem with the second member 2 as a result of the friction force, displacing the floating wedge member 6 to the upper part of the wedge-shaped window means 5 (wedge-shaped space), to a state wherein the toothed surface 7 of the floating wedge member 6 and the gear means 4 are meshed.

[0028] 0028 The angular adjustment tool as described above, and as illustrated in figure 10, attaches the headrest means 48 by means of the angular adjustment tool 3 on the upper edge of the back means 46, enabling the progressive swinging of the headrest means 48 to the upright direction A and regulating the swinging thereof to the inclined direction B in a manner suited to adaptation to a sofa.

As illustrated in figure 8, the angular adjustment tool 3 is equipped with the gear means 34, and the small gear member 36 (floating wedge member 6) for use in regu-

lation having the toothed surface 37 enabling meshing with the gear means 34.

In figure 10, on the occasion when the headrest means 48 is swung to the upright direction A, the gear means 34 of the angular adjustment tool 3 and the toothed surface 37 are held in a non-contacted free state. Then, the meshed state of the gear means 34 of the angular adjustment tool 3 with the toothed surface 37, by means of a pullback operation of a specific small angle to the inclined direction B, in a configuration so as to holds the posture of the headrest means 48 is enabled.

[0029] 0029 Now, the present invention can be subjected to design modifications, for example, by dispensing with the wedge-shaped window means 5, and for example, instead by using a panel shaped member and the like pressing the contact surface 9 of the floating wedge member 6.

Moreover, the wedge operating member 11 need not have the aperture window means 20, and may have a shape having a pair of contacting surfaces above and below pressing the upper terminal surface/lower terminal surface of the floating wedge member 6, and may employ a panel shaped member and the like, such that the design or the dimensional ratios may be freely modified.

[0030] 0030 As described above the angular adjustment tool of the present invention provides the first member 1, and the second member 2 having the gear means 4, and the floating wedge member 6 having the swingable and pivotally attached toothed surface 7 enabling meshing with the gear means 4, enabling the relative swinging motion of the second member 2 to a first direction A with respect to the first member 1 and in respect of the angular adjustment tool constraining the relative swinging motion to the other direction B. Then there is the provision of the non-contact free-holding means 10 holding the toothed surface 7 of the floating wedge member 6 and the gear means 4 free of each other in non-contact on the occasion of the swinging motion to one direction A. Because of this, the meshing of the toothed surface 7 of the floating wedge member 6 with the gear means 4 enables the stationary state of the first member 1/the second member 2 at the desired angle securely without slippage. Moreover, on the occasion of the angular adjustment of the first member 1/the second member 2, the toothed surface 7 of the floating wedge member 6 and the gear means 4 may be released to the non-contacted state and held in a non-contacted free state, enabling a quiet swinging motion. In other words, the prevention of the generation of the so-called metallic noise generated by the collision of the floating wedge member 6 with the gear means 4 is enabled.

[0031] 0031 Moreover, the non-contact free-holding means 10 provides the wedge operating member 11 which is revolved through a small angular range by means of the drag-around friction force with the second member 2, and by means of the swinging motion of the first member 1 on the second member 2 to the direction A the wedge operating member 11 frees the toothed sur-

face 7 of the floating wedge member 6 from the gear means 4 to enable a free non-contacted state. In addition, because of the pushing in of the floating wedge member 6 between the wedge surface 8 formed on a side of the first member 1 and the gear means 4, resulting from the swinging motion to a small angular degree to the other direction B, the meshed state of the toothed surface 7 of the floating wedge member 6 with the gear means 4 is enabled, in a configuration constraining the relative swinging motion of the second member 2 to the other direction B relative to the first member 1 by means of the wedge action of the floating wedge member 6. As a result, by means of the meshing of the toothed surface 7 of the floating wedge member 6 with the gear means 4, and the holding of the desired angle of the posture of the first member 1/the second member 2 securely without slippage is enabled. Furthermore, while the second member 2 is swinging to the first direction A, the toothed surface 7 of the floating wedge member 6 and the gear means 4 are freed up to the non-contacted state and can be securely held in the non-contacted free state.

[0032] 0032 In addition, because the wedge operating member 11 has the rubbing contact means 12 generating a drag-around friction force on rubbing with the second member 2, the wedge operating member 11 revolves securely in tandem with the second member 2, enabling the switchover of the toothed surface 7 of the floating wedge member 6 and the gear means 4 from the non-contacted free state to the meshed state. The swinging of the first member 1 and the second member 2 with an appropriate friction resistance force is enabled.

[0033] 0033 Furthermore, the sofa of the present invention, attaches the headrest 48 by means of the angular adjustment tool 3 to the upper edge of the back means 46, and in a sofa enabling the swinging of the headrest means 48 to the upright direction A and constraining swinging to direction B. Then, the angular adjustment tool 3 is equipped with the gear means 34, and the small gear member 36 for use in regulation having the toothed surface 37 enabling meshing with the gear means 34, and on the occasion of the swinging motion of the headrest means 48 to the upright direction A, the gear means 34 of the angular adjustment tool 3 and the toothed surface 37 are held in a non-contacted free state. Also, a meshing state of the gear means 34 of the angular adjustment tool 3 with the toothed surface 37 is enabled, by means of a specific small angular returning operation of the headrest to the inclined direction B, and the configuration enables the holding of the posture of the headrest means 48. Therefore, the prevention of the generation of a harsh noise on the ears noise at the ears on the occasion of the swinging motion of the headrest means 48 to the upright direction A is enabled, and the quiet swinging motion of the headrest means 48 is enabled.

[0034] 0034 The second embodiment of the angular adjustment tool 3 of the present invention, as represented in figures 14 to figure 32, is equipped with the first member 50, and the second member 60, and the swinging wedge

member 70, and the non-contact free-holding means 180, and the first and second covers 90 and 92, and can be swung as an integrated unit centered on the axial center L.

[0035] 0035 As illustrated in figures 15 and 16, the first member 1 described above holds the attachment means 51 and one terminal of the above described attachment means 51 held sandwiched, in addition to providing a pair of opposite facing wall means 52 and 53 in parallel with each other. Then, the opposite facing wall means 52 and 53 are tightly fixed to said attachment means 51 by the rivets 54 and 54.

Now, the method of fixing is not limited to the earlier described rivet fixation, and for example, may be fixed using bolts and nuts or by welding. Moreover, either one of the opposite facing wall means 52 and 53 or the attachment means 51 may be machined to have a protruding snap on protrusion means, and the other one may be provided with a fitting on hole for the integration thereof.

[0036] 0036 The opposite facing wall means 52 and 53 described above are formed in mirror symmetry with each other, and not only is the axial hole 56 provided in one, there is the position regulating pin 57 provided protruding on the inner facing surface of the other one (Figure 17). Then, the opposite facing wall means 52 and 53 provide the wedge shaped window means 58 between the axial hole 56 described above and the position regulating pin 57. Now, the position regulating pin 57 described above may be formed by machining to protrude, or may be formed by the attachment of a separate metallic pin.

[0037] 0037 As illustrated in figure 27, the position regulating pin 57 described above is disposed so as to be positioned respectively on the same axial center of the pair of opposite facing wall means 52 and 53. Then, the position regulating pin 57 described above prevents the rattling of the wedge operating member 81 described above by means of guidance of the leaf spring member 83 of the wedge operating member 81 which is described later. Moreover, the position regulation of the wedge operating member 81 is enabled by means of locking with the above described leaf spring member 83.

[0038] 0038 The wedge-shaped window means 58 described above, as illustrated in figure 17, has an arc shaped wedge surface 58a. Then, the wedge surface 58a described above is formed so as to gradually approach to the gear means 66 of the later described second member 60 (Figure 25). Moreover, the wedge-shaped window means 58 described above has a retraction space 58b for the purposes of storing the separated state of the floating wedge member 70 from the gear means 66. In addition, the wedge-shaped window means 58 described above forms the induction inclined surface 58c in continuity with the retrieval space 58b described above.

Moreover, as illustrated in figure 25, a shrinking wedge-shaped space is formed along the clockwise direction by means of an outer peripheral toothed surface of the gear

means 66 and the wedge surface 58a. The later described floating wedge member 70 can be freely displaced and assembled into the wedge-shaped space described above.

[0039] 0039 The second member 60 described above, as illustrated in figures 15 and 16, provides the attachment means 61, and a pair of gear plate means 62 and 63 which are parallel to and opposite facing each other sandwiched by one terminal of the above described attachment means 61. Then, the gear plate means 62 and 63 are fixed and secured to the attachment means 61 described above by the rivets 64 and 64. Now, the method of fixation is not limited to the fixation method described above, for example, and may be fixed using bolts and nuts or by welding. Moreover, a fitting-on protrusion is provided protruding out on either one of the attachment means 61 or the gear plate means 62 and 63, and the hole for fitting on may be provided on the other one for the integration thereof.

[0040] 0040 The gear plate means 62 and 63 described above are formed in mirror symmetry with each other, and each has the axial holes 65 and 65 for the purposes of the insertion of the pivot axis 94 there through. Moreover, the gear plate means 62 and 63 described above form the gear means 66 in the range of 100° to 120° of the center angle in an arc shaped outer peripheral edge means on one terminal side thereof. In addition, the protrusion means 67 for use in pressing downwards is provided on the initial edge means of the gear means 66 described above. Further, the protrusion means 68 for use in pressing upwards is provided on the end terminal means of the gear means 66 described above.

Then, the two gear plate means 62 and 63 of the second member 60 are inserted between the opposite facing wall means 52 and 53 of the first member 50 described above, and are connected in a swingable manner via the later described pivot axis 94.

[0041] 0041 In this embodiment, there is disclosure of the fact that each of the first and second members 50 and 60 are formed from three constituent part plates, but is not necessarily limited thereto. For example, the first and second members 50 and 60 described above may overlay mirror symmetry formed two constituent parts, and integrate them using welding, riveting, fixing with bolts and nuts, or by using fit-on protrusions thereon.

[0042] 0042 The floating wedge member 70 described above, as illustrated in figure 18, has the contact surface 71 on one surface side thereof, and has the toothed surface 72 on the other surface side thereof. The contact surface 71 described above, as illustrated in figure 28, contacts with the wedge surface 58a formed on the first member 50 side. Then, when the floating wedge member 70 contacts that contact surface 71 with the wedge surface 58a, in addition to, when the toothed surface 72 and the gear means 66 mesh, the swinging motion of the second member 60 with respect to the first member 50 in the arrow direction B in the figure is inhibited by means

of the wedge effect.

[0043] 0043 Now, as illustrated in figure 24, there are a plurality, preferably five or six teeth formed in the toothed surface 72 of the floating wedge member 70. This toothed surface 72 and the gear means 66 mesh at two locations in the left and right horizontal direction, in addition to, preferably simultaneously meshing all of the teeth of the toothed surface 72 the gear means 66.

Moreover, for example, 13 to 20 teeth are formed in the toothed surface 72 of the floating wedge member 70, and more than 40 teeth, more preferably 45 to 65 teeth, may be formed in the gear means 66. By this means, the number of stages of angular adjustment is enabled with 40 or more stages.

[0044] 0044 The non-contact free-holding means 80 described above, as illustrated in figures 15 and 16, provides the wedge operating member (operational plate) 81 revolved in a small angular range around the axial center L by means of the drag-around friction force with the second member 60.

[0045] 0045 The wedge operating member 81 described above, as illustrated in figures 19 and 20, is beaten out by press machining of one sheet of metallic plate, and is formed by folding over. Then, the wedge operating member 81 has the aperture window means 82 provided in the center thereof, and a pair of leaf spring member 83 and 83 provided on one side of said aperture window means 82, and the axial hole 84 provided on the other side of said aperture window means 82. Furthermore, said wedge operating member 81 is supported in a swingable manner in the inserted state between the gear plate means 62 and 63, together with the second member 60.

[0046] 0046 The aperture window means 82 described above is for the purposes of holding the floating wedge member 70 in a freely displaceable manner, and has an arched surface 82a in the outer side thereof as seen from the center point (the center L). The arc surface 82a described above has a tapered surface 82b formed at an acute angle Φ in one terminal edge thereof. Moreover, the arc surface 82a described above provides a stepped means 82c on the other terminal edge thereof.

[0047] 0047 The leaf spring member 83 described above provides a vertical slit along the other side edge means of the wedge operating member 81 described above, and forms cut-out parts at substantially right angles which are bent upwards there from. As a result, both terminal means of the long direction of leaf spring members 83 are connected to the wedge operating member 81.

Furthermore, the leaf spring members 83 described above have the protrusion means 83a protruding to the exterior from the intermediate part of the long direction thereof. Then, the leaf spring members 83 described above form a recessed means 83b for the purposes of ligature to the basal means of one side of the protrusion means 83a described above. By locking the position regulating pin 57 recessed means 83b for the purposes of ligature, the wedge operating member 81 is position con-

strained so as not to be revolved by means of the drag-around friction forces of the second member 60. Moreover, the leaf spring members 83 described above form the recessed means 83c for use in guidance on the other direction side to the protrusion means 83a described above. When the position regulating pin 57 is located in the recessed means 83c for use in guidance as described above, while the leaf spring members 83 are being guided to the position regulating pin 57 described above, the wedge operating member 81 is revolved together with the second member 60 by means of the drag-around friction forces.

Now, the position regulating pin 57 described above may be guided into the recessed means 83c for use in guidance described above, and does not need to be normally in sliding contact.

Furthermore, the leaf spring members 83 described above need not necessarily be provided as a pair of springs, and may be just one on one side.

[0048] 0048 The axis hole 84 described above is for the purposes of the insertion there through of the pivot axis 94 which is described later. Then, a wave shaped annular means 85 is provided in the peripheral edge means of said axial hole 84 as the sliding contact means.

The wave shaped annular means 85 has multiple elevated means 85a. Said elevated means 85a provide non-continuous (multiple) arc shaped slits 85c leaving the connection remaindered means 85b in the peripheral edge means of the axial hole 84, in addition to the inner side parts of said arc shaped slits 85c being formed in a bay curve in the plate thickness direction. Then, because said wave shaped annular means 85 is elastically deformed mobile, the elevated means 85 are elastically pressure contacted to the inner direction surface of the year plate means 62 and 63 of the second member 60. As a result, an optimal drag-around friction force is generated between the wedge operating member 81 and the second member 60. As a result of this, the wedge operating member 81 and the second member 60 are revolved in unison by means of said drag-around friction forces.

[0049] 0049 Now, as illustrated in figures 21 and 22, the wedge operating member 81 described above may provide an annular sliding contact means 86 and the inner peripheral edge means of said wave shaped annular means 85. By means of the provision of the annular shaped sliding contact means 86, the wave shaped annular means 85 described above is reinforced, which not only improves the longevity thereof, there is the benefit that the sliding action is smoother and more stable.

[0050] 0050 Moreover, the wedge operating member 81 is not limited to the earlier described embodiments, and by providing perforation holes and slits in one sheet of a metal plate, the aperture window means 82, and the axial hole 84 on the other side of said aperture window means 82, and the leaf spring member 83 and the other direction side of said aperture window means 82 may be formed by cut-out machining.

[0051] 0051 The first and second covers 90 and 92 are for the purposes of preventing the fallout of the above described floating wedge member 70. Then, the first and second covers 90 and 92 not only have the facial shapes covering the outer peripheral surface of the opposed wall means 52 and 53 of said first member 50, they also provide each of the axial holes 91 and 93.

[0052] 0052 Next, the assembly method of the constituent of parts described above is explained.

The wedge operating member 81 is inserted and positioned between the integrated year plate means 62 and 63 of the second member 60. Then, those gear plate means 62 and 63 and the wedge operating member 81 are inserted and positioned between the opposing wall means 52 and 53 of the first member 50. Furthermore, after positioning the first cover 90 in the opposing wall means 52, the pivot axis 94 is inserted and locked into the axial holes 91, 56, 65, 84, 65, 56. Next, the floating wedge member 70 is inserted from the wedge-shaped window means 58 of the opposing wall means 53 to the aperture window means 82 and to the wedge-shaped window means 58 of the opposite surface wall means 52. Then, the axial hole 93 of the second cover 92 is fitted on to the pivot axis 94, preventing the floating wedge member 70 from falling out. Finally, by closing-off of both terminals of the pivot axis 94, the constituent of parts described above are integrated in conjunction.

[0053] 0053 Next the usage method of the angular adjustment tool 3 of the second embodiment is explained. As illustrated in figure 28, when the second member 60 is leaned in the direction of arrow B in respect of the first member 50, the meshed state of the toothed surface 72 of the floating wedge member 70 with the gear means 66 is enabled. Moreover the floating wedge member 70 is pushed into the gradually narrowing space formed between the wedge surface 58a and the gear means 66. As a result, the floating wedge member 70 is constrained from swinging to the direction B of the second member 60 by means of the wedge effect, and the angle of inclination between the first member 50 and the second member 60 is sustained (held fixed).

In other words, in the mesh state illustrated in figure 28, as a result of the meshing between the toothed surface 72 of the floating wedge member 70 and the gear means 66, there is no slippage of the second member 60, and the inclined angle between the first member 50 and the second member 60 is securely maintained.

[0054] 0054 Conversely, when the second member is swung in the direction of arrow A, as illustrated in figure 29, the wedge operating member 81 starts to revolve in unison with the second member 60 as a result of the drag-around friction forces generated based on the spring forces of the wave shaped annular means 85. As a result, the floating wedge member 70 is displaced in the downward direction in the wedge-shaped window 58. Then, the upper terminal surface of the floating wedge member 70 is pressed to the tapered surface 82b of the wedge operating member 81. As a result, the floating

wedge member 70, whilst in sliding contact with the induction gradient surface 58c of the wedge shaped window means 58, is slightly displaced in the separated direction from the gear means 66. Then, the floating wedge member 70 is displaced from the wedge surface 58a in the lower part of the wedge-shaped window means 58. As a result, a minute gap is generated between the toothed surface 72 and the gear means 66, and the floating wedge member 70 adopts the non-contacted free state (figure 29). In the non-contacted free state, the floating wedge member 70 is supported by means of the three points of the induction gradient surface 58c of the wedge-shaped window means 58, the tapered surface 82b of the wedge operating member 81, and the stepped means 82c. In the non-contacted free state, because there is no contact between the floating wedge member 70 and the gear means 66, there is no generation of a harsh metallic sound, and the second member 60 is swung quietly in the direction of arrow A.

Moreover, whilst there is the generation of the drag-around friction forces between the wedge operating member 81 and the second member 60, because the floating wedge member 70 is pushed upwards by the wedge operating member 81, there is no meshing of the toothed surface 72 with the gear member 66.

In other words, while the swinging operation of the second member 60 in the arrow direction A is being performed, the floating wedge member 70 is held without generating a harsh metallic noise, and the toothed surface 72 of the floating wedge member 70 and the gear means 66 are held in the non-contacted state.

[0055] 0055 As illustrated in figure 30, when the second member 60 is swung further in the direction of arrow A, and the upper terminal surface of the floating wedge member 70 is pressed by protrusion means 67 for use in pressing down in one direction, the wedge operating member 81 not only revolves in unison, but the floating wedge member 70 presses down on the wedge operating member 81. As a result, the protrusion means 83a of the leaf spring member 83 provided on the wedge operating member 81 rides over the position regulating pin 57. As a result, the position regulating pin 57 is locked into the recessed means 83b for use in locking. Then, the lower terminal surface of the floating wedge member 70 is stored in the retraction space 58b, to adopt the retracted state.

In the retracted state, the floating wedge member 70 is stored in the retraction space 58, in addition to the recessed means 83b for use in locking of the leaf spring member 83 being locked in to the position regulating pin 57. For this reason, even if the second member 60 is swung to the direction B as a result of the spring force of the leaf spring member 83 locking the position regulating pin 57, the unmeshed state of the gear means 66 with the toothed surface 72 is held. As a result, the wedge operating member 81 does not revolve in unison, and the free swinging of the second member 60 in the direction B with respect to the first member 50 is enabled.

[0056] 0056 Next, as represented in figure 32, when the second member 60 is swung in the direction of arrow B, just before the second member 60 adopts the straight line with respect to the first member 50, the protrusion means 68 for use in pushing up contacts with the lower terminal surface of the floating wedge member 70.

Then, when the second member 60 is swung slightly strongly in the direction of arrow B, the protrusion means 68 for use in pushing up pushes up the lower terminal surface of the floating wedge member 70, displacing the floating wedge member 70 from the retracted space 58b upward. On that occasion, in tandem with the displacement of the floating wedge member 70, the upper terminal surface of the floating wedge member 70 presses up the tapered surface 82b of the wedge operating member 81. As a result, the wedge operating member 81 is revolved clockwise in figure 32 around the center of the axial center L. As a result, the locked state of the recessed means 83b for use in locking of the leaf spring member 83 and the position regulating pin 57 is released, and the position regulating pin 57 is displaced to the recessed means 83b for use in guidance of the leaf spring member 83. Then, as a result of the friction forces between the wedge operating member 81 and the second member 60, they revolve in unison. As a result, the floating wedge member 70 is displaced to the upper part of the wedge shaped window means 58 (wedge-shaped space), and the toothed surface 72 of the floating wedge member 70 and the gear means 66 adopt the meshed state.

[0057] 0057 Now, in this embodiment, the position of the straight line state (180°) of the second member 60 with respect to the first member 50 is the final deployed position, but it is not necessarily limited thereto. By appropriately selecting the range of the center angle provided for the gear means 66, for example, the second means 66 may have a final deployed position positioning it forming a 120° angle with respect to the first member 50.

[0058] 0058 Next, when the second member 60 is once more swung in the direction of arrow A, the wedge operating member 81 begins to revolve in unison with the second member 60 as a result of the drag-around friction forces based on the spring force of the wave shaped annular means 85. As a result, the floating wedge member 70 is displaced in the downward direction in the wedge-shaped window means 58. Then, the upper terminal surface of the floating wedge member 70 is pressed to the tapered surface 82b of the wedge operating member 81. As a result, the floating wedge member 70, whilst in sliding contact with the induction gradient surface 58c of the wedge-shaped window means 58, is slightly displaced in the separated direction from the gear means 66. As a result, because the floating wedge member 70 is disposed away from the wedge surface 58a by the lower means of the wedge-shaped window 58, a minute gap is generated between the toothed surface 72 and the gear means 66, and once more the floating wedge member 70 adopts the non-contacted free state (figure 29). Therefore, there is no generation of the harsh me-

tallic noise. Then, when the second member 60 is swung in the direction of arrow B, the toothed surface 72 of the floating wedge member 70 and the gear means 66 mesh. In addition, the floating wedge member 70 is pushed into the gradually narrowing formed between the wedge surface 58a and the gear means 66. As a result, the floating wedge member 70 is constrained from swinging to the direction B of the second member 60 by means of the wedge effect, and the inclined angle of the first member 50 with the second member 60 is sustained (held fixed), and returns to the state illustrated in figure 28.

The wedge shape member in one or all of the embodiments described, is preferably not subjected to a spring force forcing the wedge member into the meshing condition with the gear means 4.

Also preferably the wedge member is subjected to a friction force from moving not freely in a different position. The friction force may be created on one or both of the end-faces of the wedge member 6. In the second embodiment described, this can be reached e.g. by a friction force between one or both of said end faces with one or both other means 90 and 92. Even not described in detail, one or both of such cover means may also be present in the first embodiment.

Industrial utility

[0059] 0059 The drive adjustment tool of the present invention is not limited to the earlier described embodiments, and may be used in furniture other than sofas.

Explanation of the reference numerals

[0060]

1. The first member
2. The second member
3. The angular adjustment tool
4. The gear means
6. The floating wedge means
7. The toothed surface
8. The wedge surface
10. The non-contacted free state holding means
11. The wedge operating member (operating plate)
12. The rubbing means
16. Leaf spring member
17. Facing wall means
18. Attachment means
21. Hole means
22. Surface
23. Tapered surface
24. Connected axis
25. Recessed means
27. Side wall means
28. Connection means
29. Tongue-shaped cut-out
34. The gear means
36. The small gear member for use in control

37	The toothed surface	
46	The back means	
48	The headrest means	
50	The first member	
51	The attachment means	5
52	The opposite facing wall means	
53	The opposite facing wall means	
56	The axel hole	
57	The position regulating pin	
58	The wedge shaped window means	10
58a	The wedge surface	
58b	The retraction space	
58	The wedge shaped window means	
59	The induction gradient surface	
60	The second member	15
61	The attachment means	
62	The gear plate means	
63	The gear plate means	
64	The rivets	
65	The axel hole	20
66	The gear means	
67	The protrusion means for use in pressing down	
68	The protrusion means for use in pressing up	
70	The floating wedge member	
71	The contact surface	25
72	The toothed surface	
80	The non-contact free holding means	
81	The wedge operating member	
82	The aperture window means	
82a	The arc surface	30
82b	The tapered surface	
82c	The stepped means	
83	The leaf spring member	
83a	The protrusion means	
83b	The recessed means for use in locking	35
83c	The recessed means for use in guiding	
84	The axel hole	
85	The wave shaped annular means (sliding contact means)	
86	The annular sliding contact means	40
90	The first cover	
91	The axel hole	
92	The second cover	
93	The axel hole	
94	The pivot axis	45
L	Axial center	
A	One direction (The upright direction)	
B	The other direction (The inclined direction)	
Φ	Acute angle	50

Claims

1. An angular adjustment tool (3) equipped with a first member (1), and a second member (2) having a gear means (4), and a swingable floating wedge member (6) having a toothed surface (7) which can mesh with said gear means (4), and in respect of an angular

adjustment tool with constrained relative swinging motion to the opposite direction (B) from the relative swinging motion enabled to one direction (A) of said second member (2) with respect to said first member (1),

characterized by providing a free-holding means (10) enabling the holding of the toothed surface (7) of said floating wedge member (6) to be freely held in non-contact with said gear means (4) on the occasion of the swinging motion to said one direction (A).

2. The angular adjustment tool (3) claimed in claim 1 **characterized by** said free-holding means (10) providing a wedge operating member (11) revolved through a small angular range by means of the friction force accompanying the revolution with said second member (2), and by means of the swinging motion to said one direction (A) of said second member (2) with respect to said first member (1) said wedge operating member (11) causes said toothed surface (7) of said floating wedge member (6) to be in a non-contacted free state free and non-contacted with said gear means (4), and in addition, by means of the swinging to said small angular degree to said other direction (B), said floating wedge member (6) is pressed in between the wedge surface (8) formed in said first member (1) side, and said gear means (4), and in the configuration with the meshed state of said toothed surface (7) of said floating wedge member (6) with said gear means (4), the constraint of the relative swinging motion to said other direction (B) of said first member (1) and said second member (2) is enabled by means of the wedge effect of said floating wedge member (6).

3. The angular adjustment tool (3) according to one of the claims 1 or 2, wherein said non-contact free-holding means (80) provides a wedge operating member (81) which is revolved through a small angular range by means of the friction forces accompanying the revolution with said second member (60), and configures a non-contacted free state wherein said wedge operating member (81) holds said toothed surface (72) of said floating wedge member (70) in a non-contacted free state from said gear means (66), by means of the swinging motion to said first direction (A) of said second member (60) with respect to said first member (50), in addition to a meshed state of said toothed surface (72) of said floating wedge member (70) with said gear means (66) by the pushing-in of said floating wedge member (70) between said gear means (66) and the wedge surface (58a) formed on said first member (50) side, by means of the swinging motion to said other direction (B), wherein the relative swinging motion to said other direction (B) of said second

member (60) with respect to said first member (50) is constrained by means of the wedge effect of said floating wedge member (70).

4. The angular adjustment tool (3) according to one of the previous claims, wherein said wedge operating members (11, 81) have a rubbing means (12, 85) generating friction forces accompanying said revolution while in sliding contact with said second member (2, 60). 5
10
5. The angular adjustment tool (3) according to one of the previous claims, **characterized in that** the wedge member (6) is not subjected to a spring force for reaching the meshed condition. 15
6. The angular adjustment tool (3) according to one of the previous claims, **characterized in that** the member (6) is subjected to a friction force for restricting a free moving of the wedge member (6) 20
7. The angular adjustment tool (3) according to one of the previous claims, **characterized in that** the swingable floating wedge member (6) is pivotally connected, preferably by means of the free-holding means (10). 25
8. A sofa **characterized by** a configuration attaching a headrest means (48) via the angular adjustment tool (3) claimed in any one of claims 1 to 4 on the upper edge of the back means (46), and in respect of the sofa which enables a progressive swinging motion of said headrest means (48) to the upright direction (A) and the constraint of the swinging motion thereof to the inclined direction (B), 30
35
said angular adjustment tool (3) is equipped with a gear means (34), and a small gear member (36) for use in regulation having a toothed surface (37) enabling meshing with said gear means (34), and on the occasion that said headrest means (48) is swung in said upright direction (A), said gear means (34) of said angular adjustment tool (3) and said toothed surface (37) are held in a non-contacted free state, and by means of a pull=back operation to a specific small angular degree to said inclined direction (B) 40
45
said gear means (34) of said angular adjustment tool (3) and said toothed surface (37) are caused to be in a meshed state, holding the posture of said headrest (48). 50

55

Figure 1

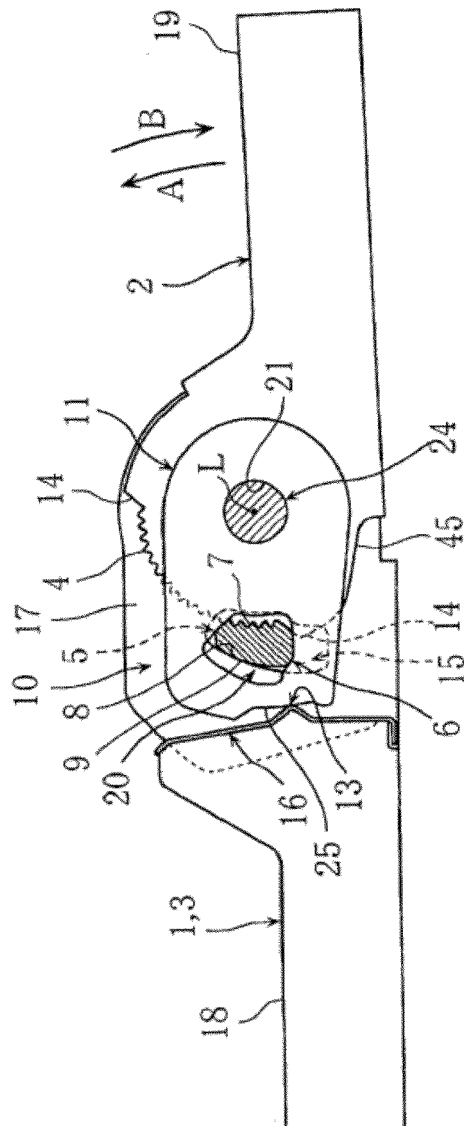


Figure 2

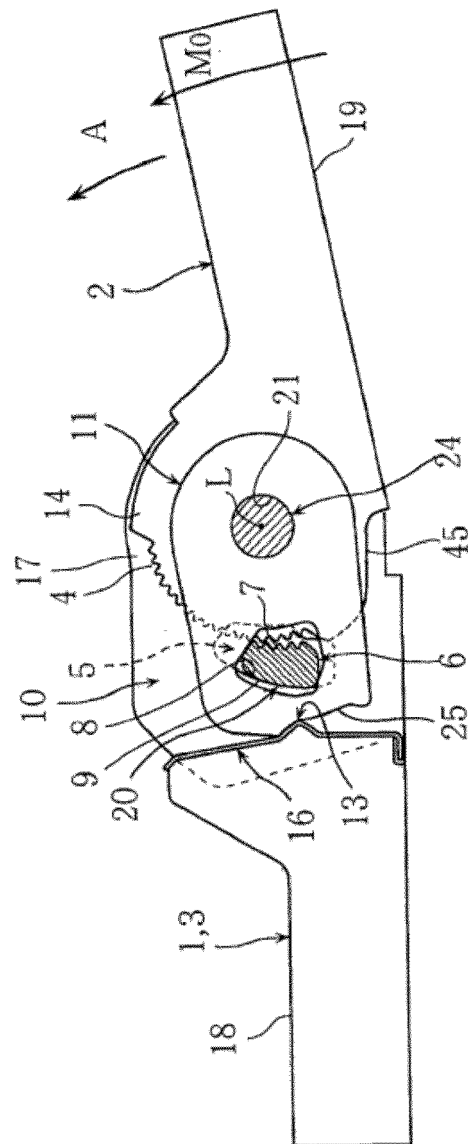


Figure 3

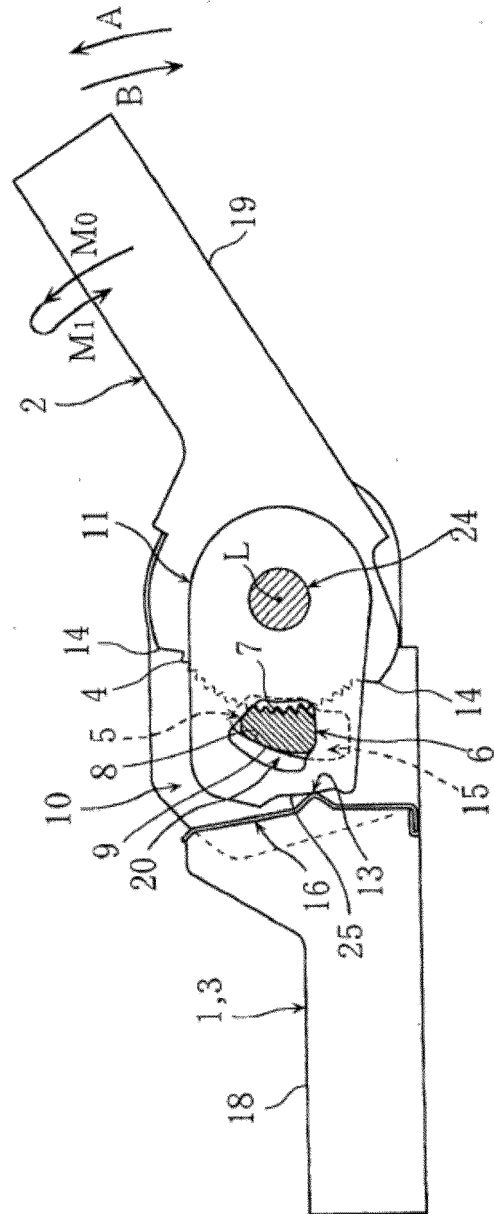


Figure 4

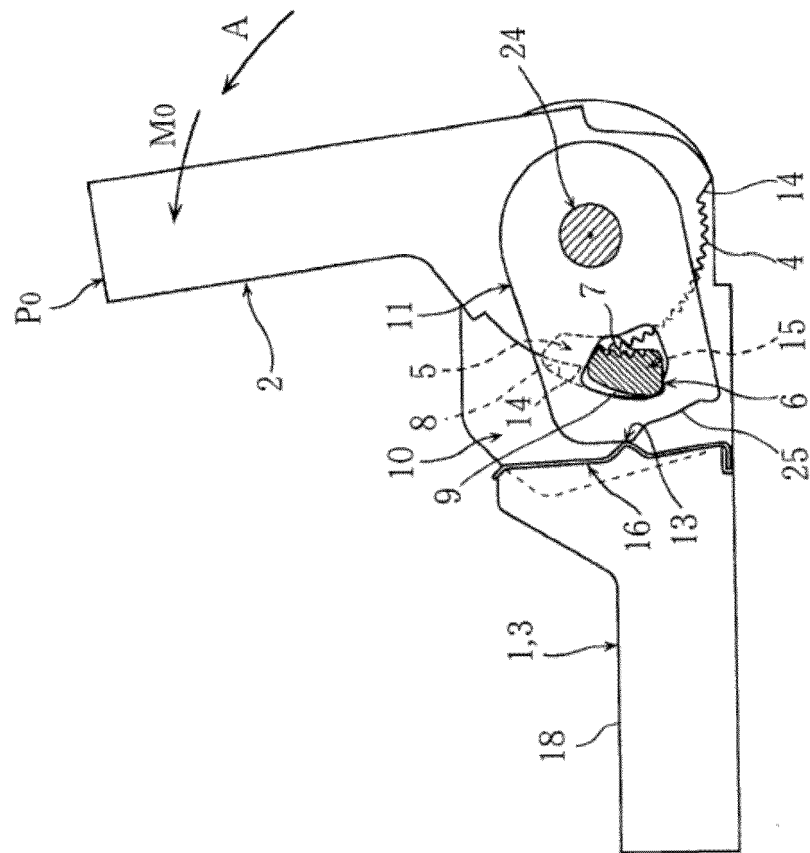


Figure 5

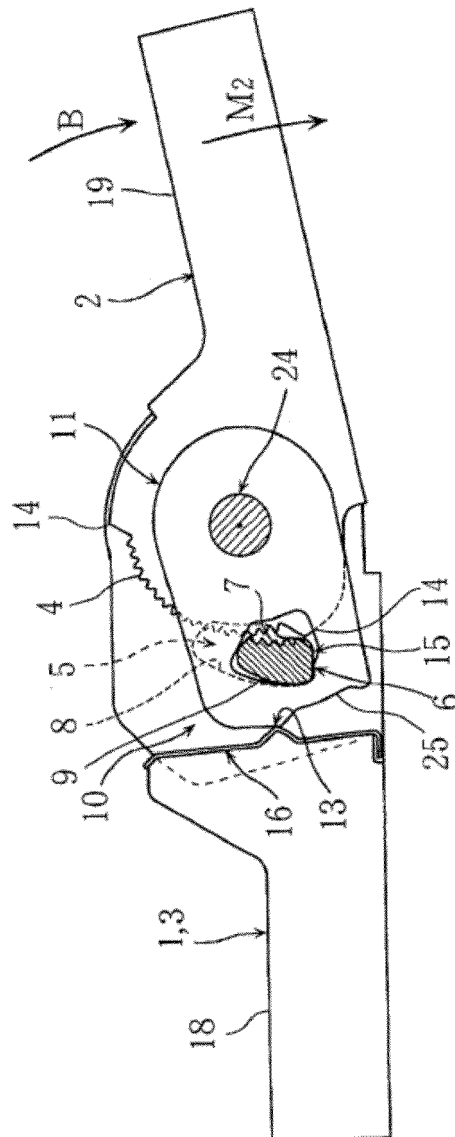


Figure 6

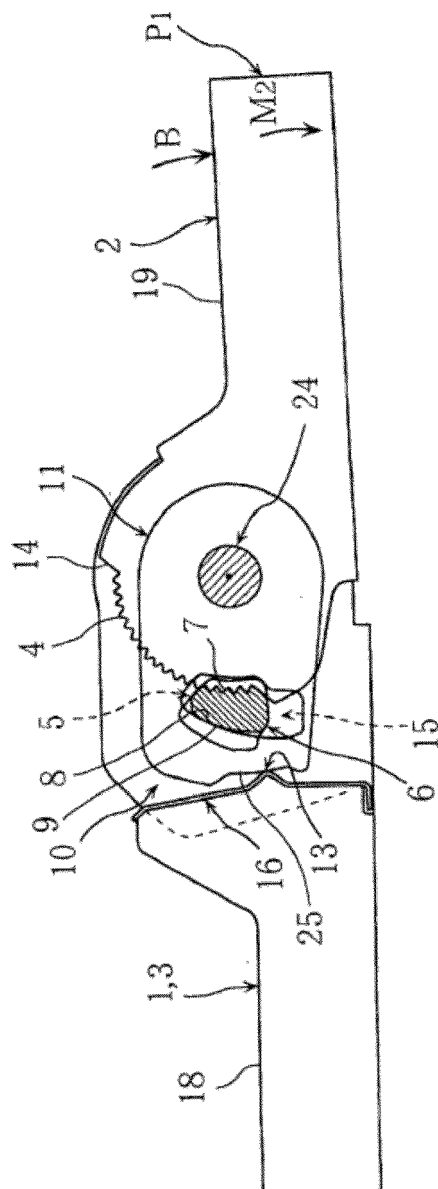


Figure 7

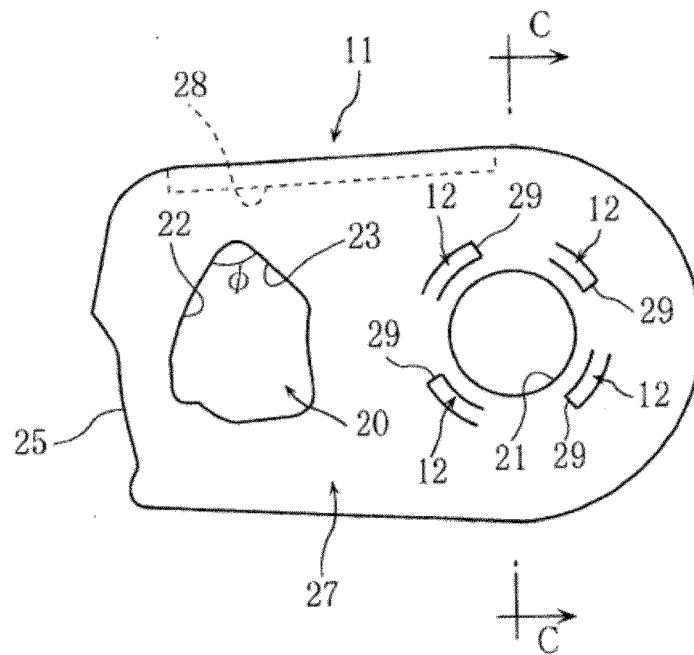


Figure 8

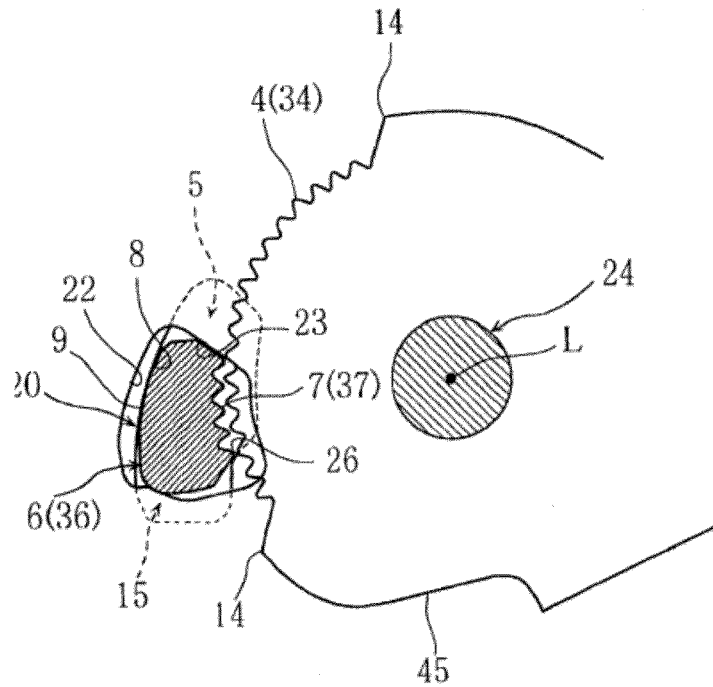


Figure 9

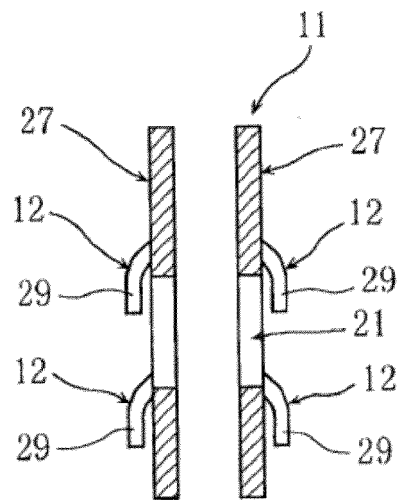


Figure 10

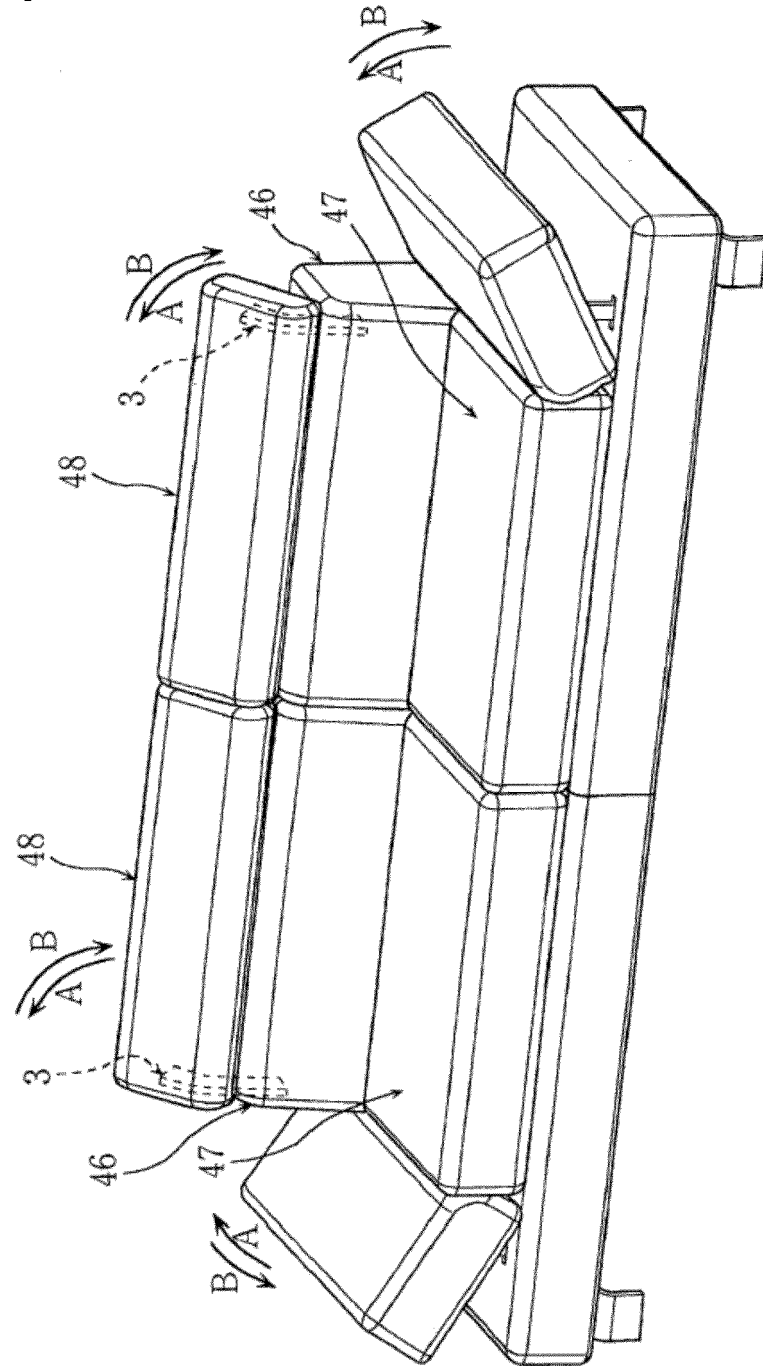


Figure 11

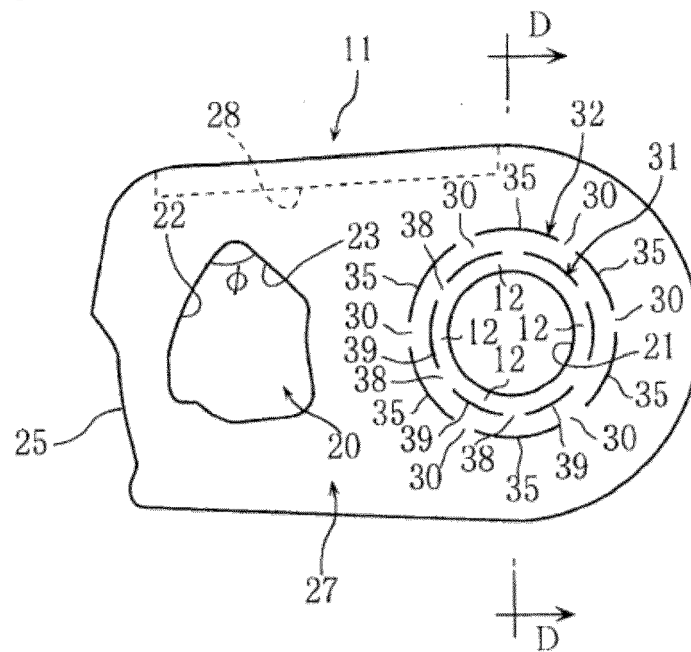


Figure 12

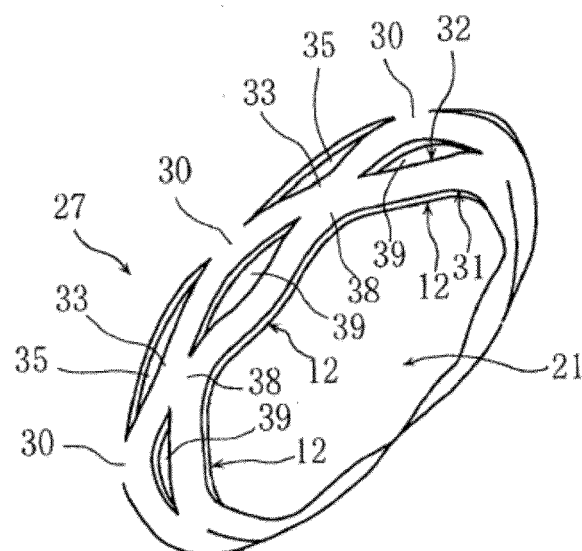


Figure 13

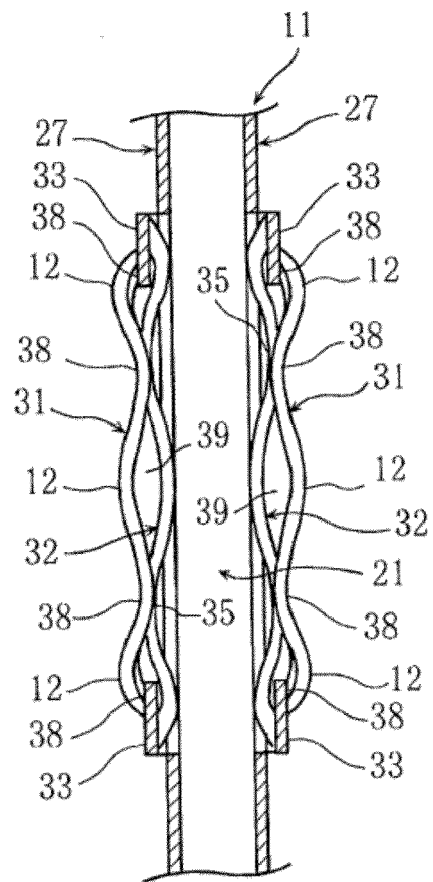


Figure 14

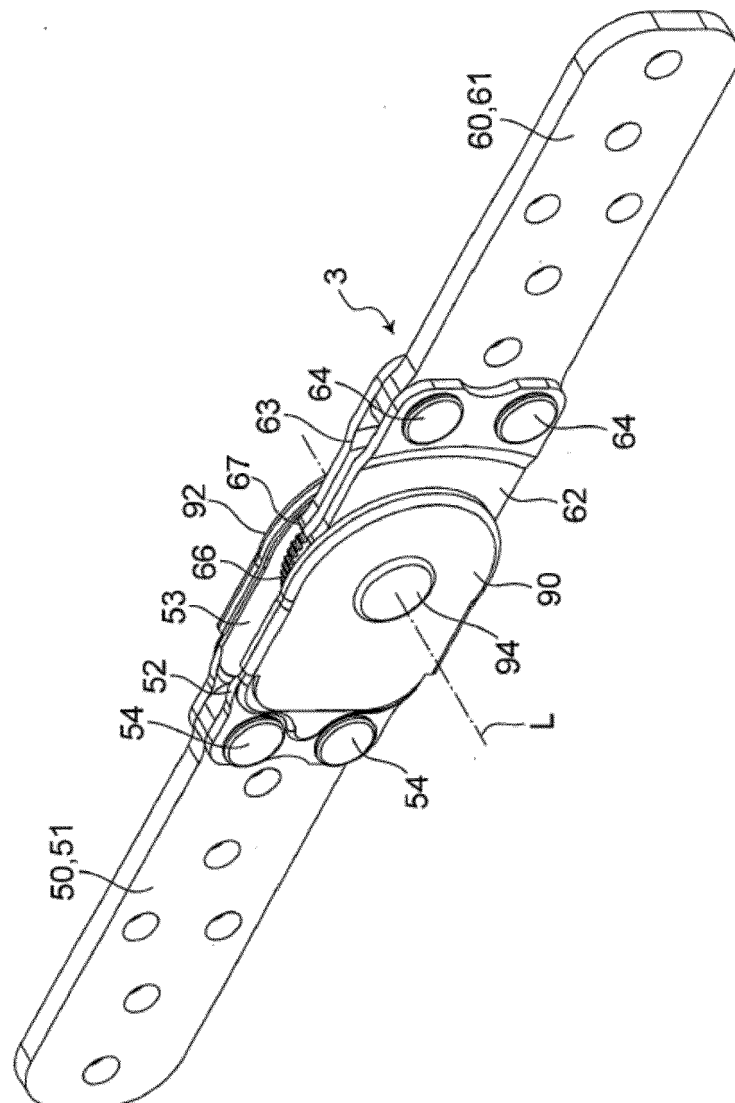


Figure 15

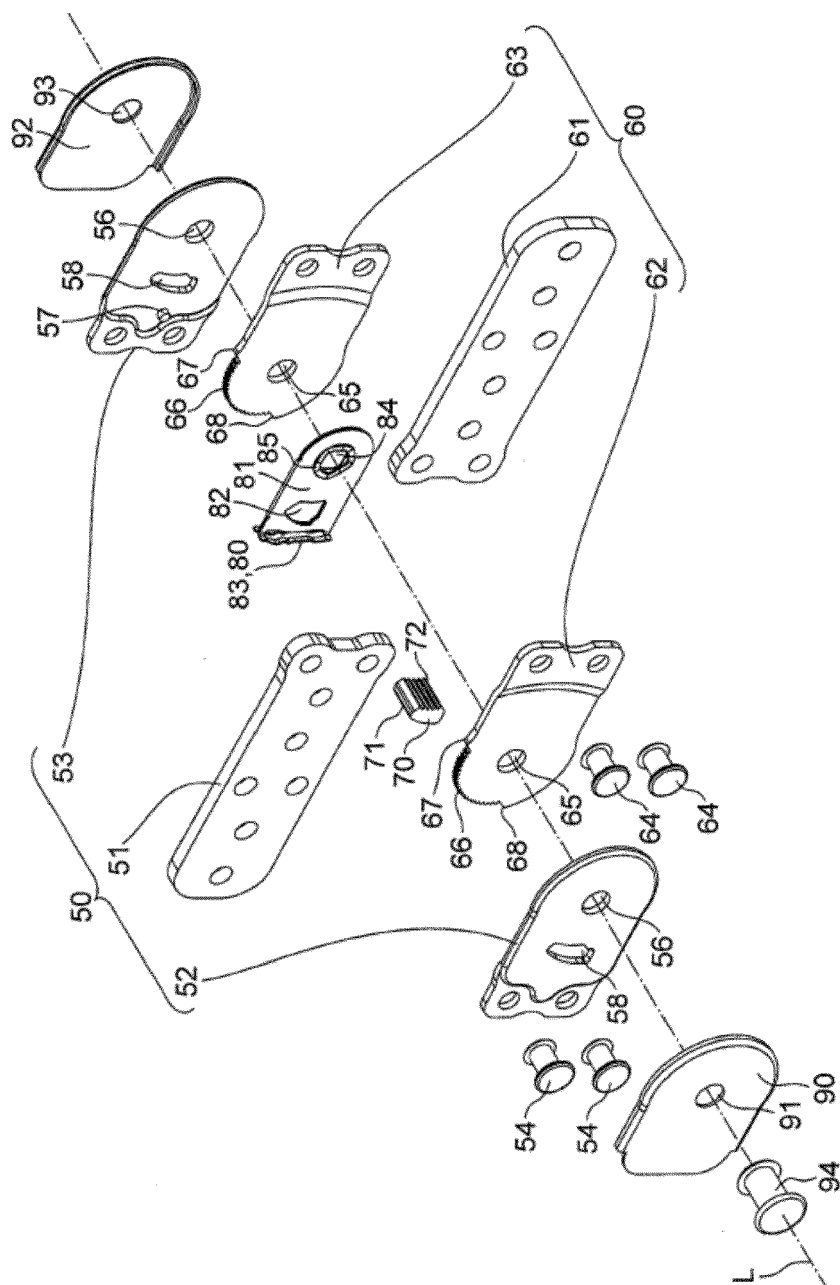


Figure 16

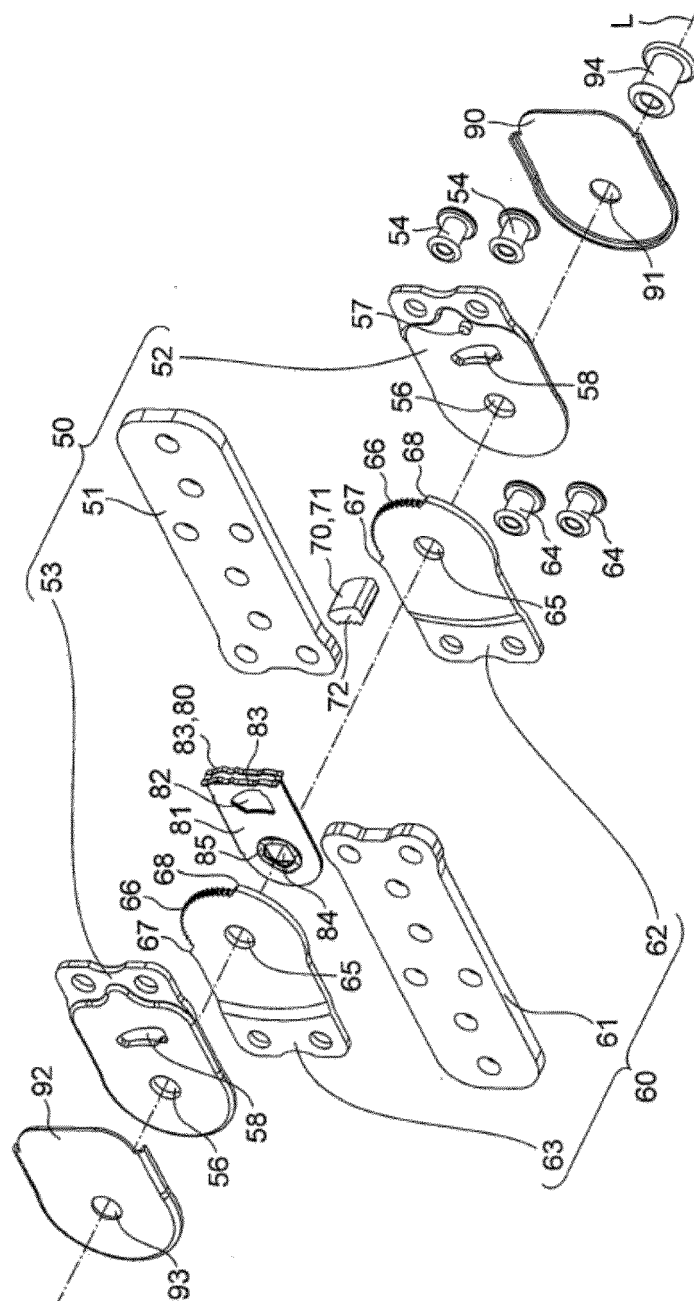


Figure 17

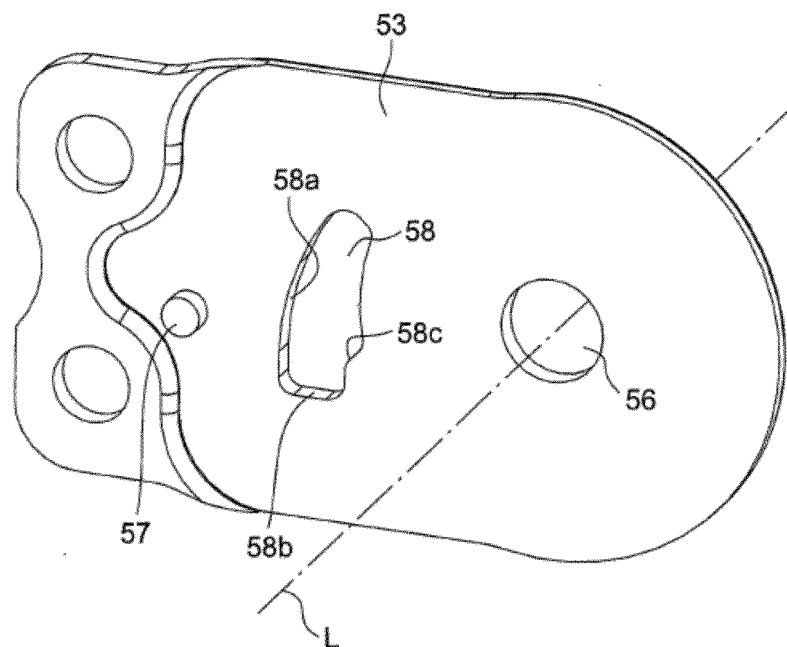


Figure 18

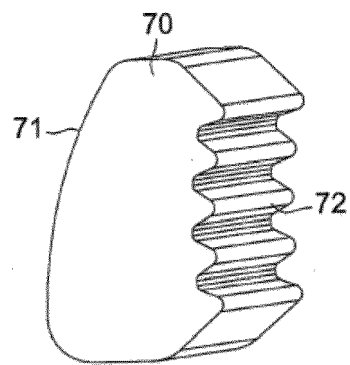


Figure 19

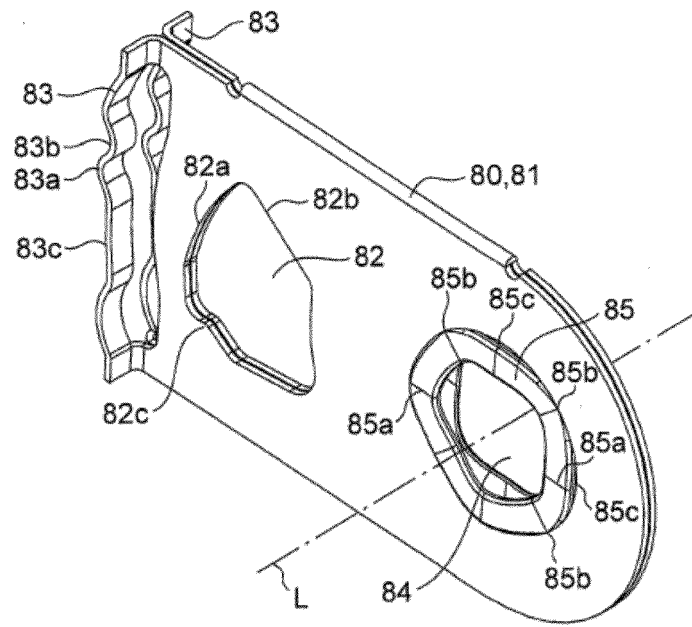


Figure 20

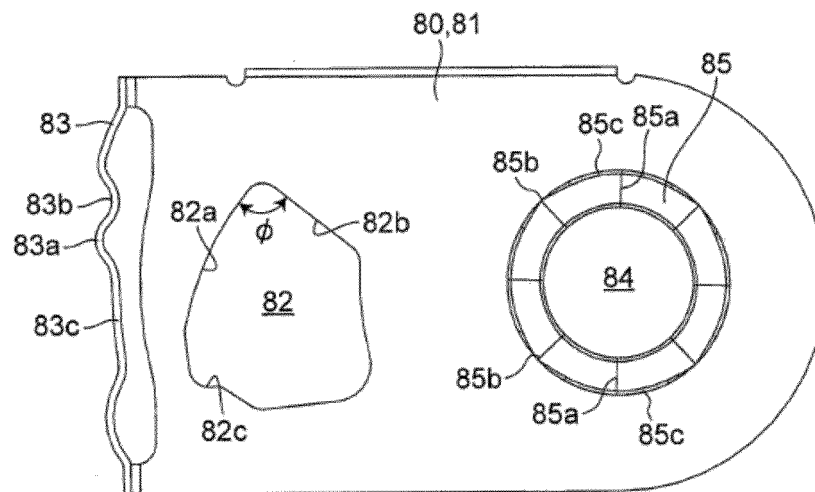


Figure 21

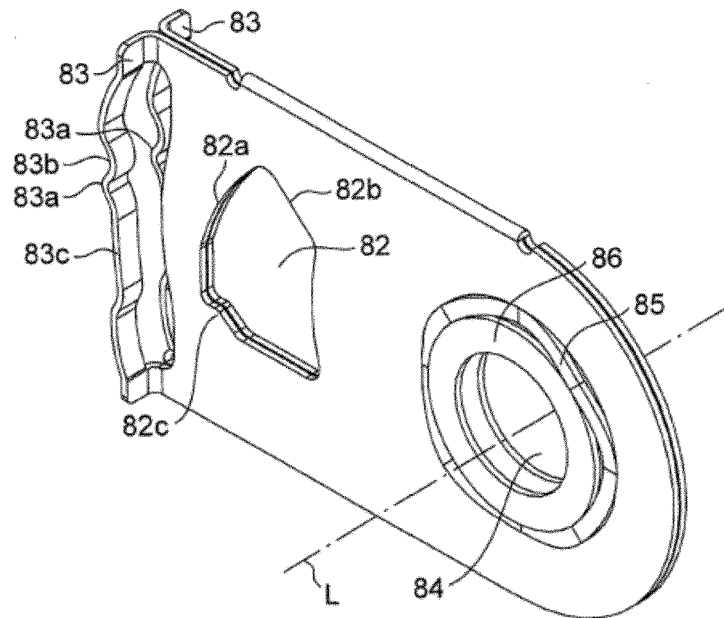


Figure 22

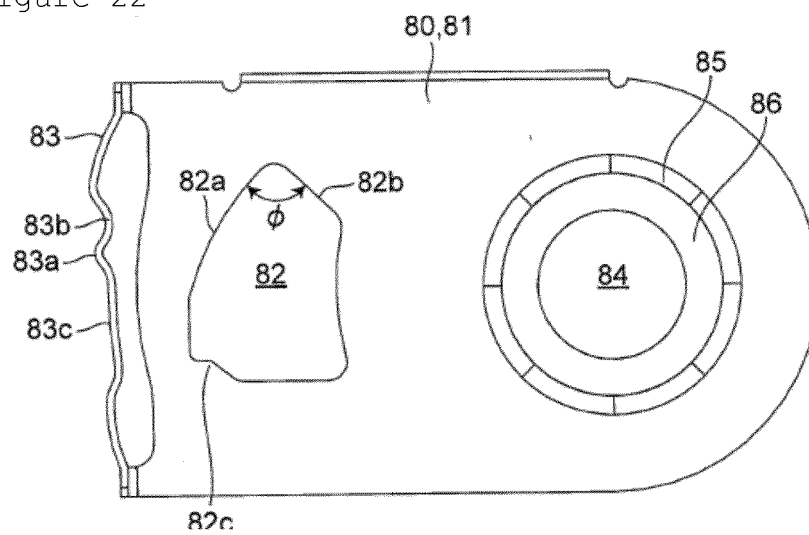


Figure 23

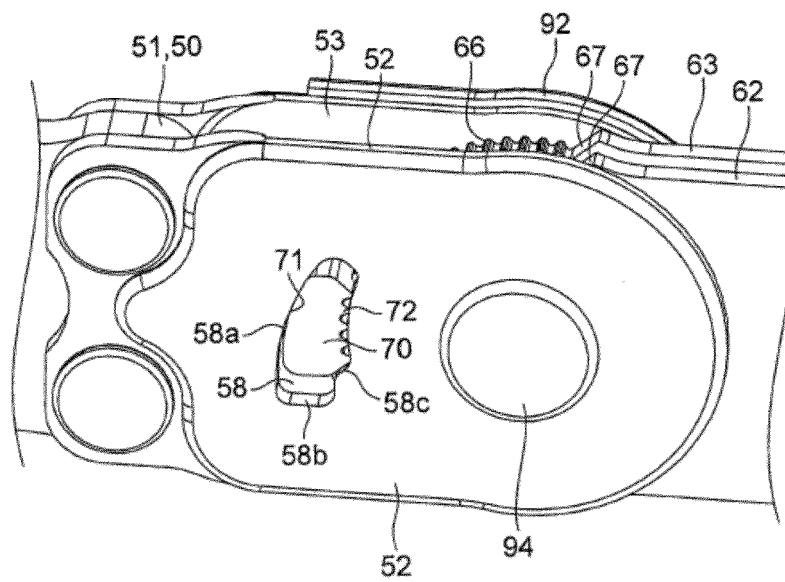


Figure 24

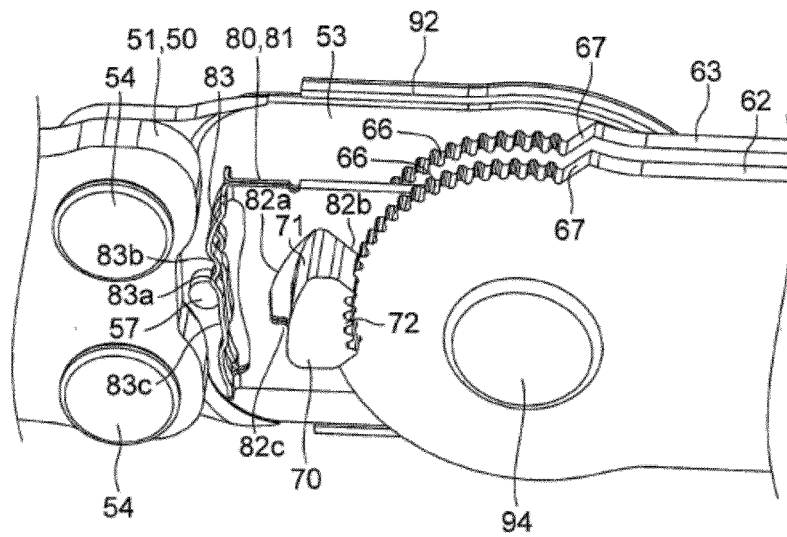


Figure 25

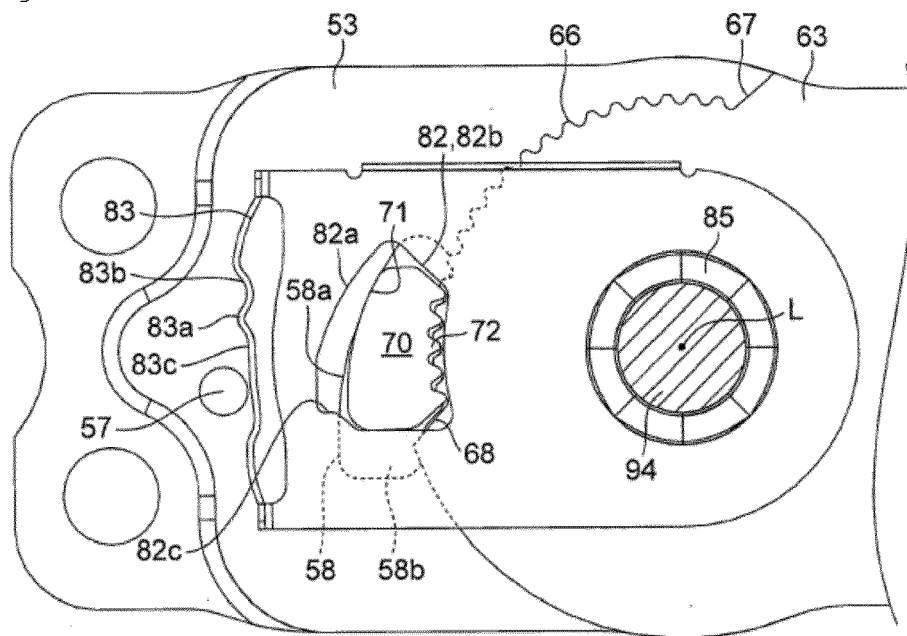


Figure 26

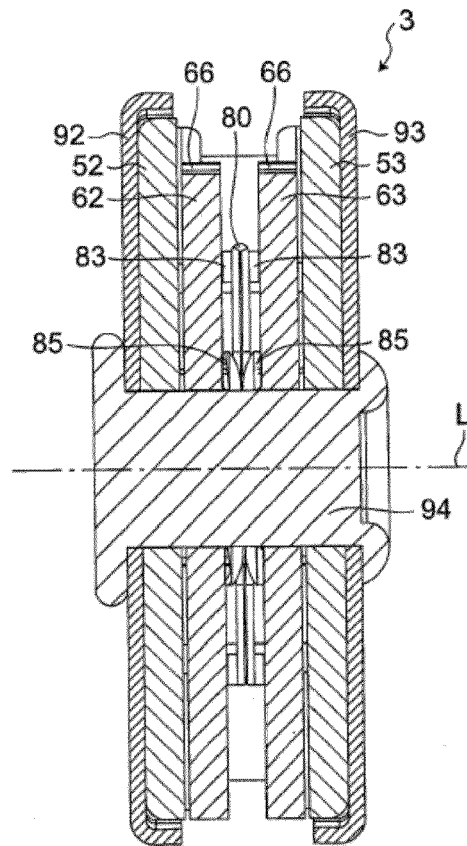


Figure 27

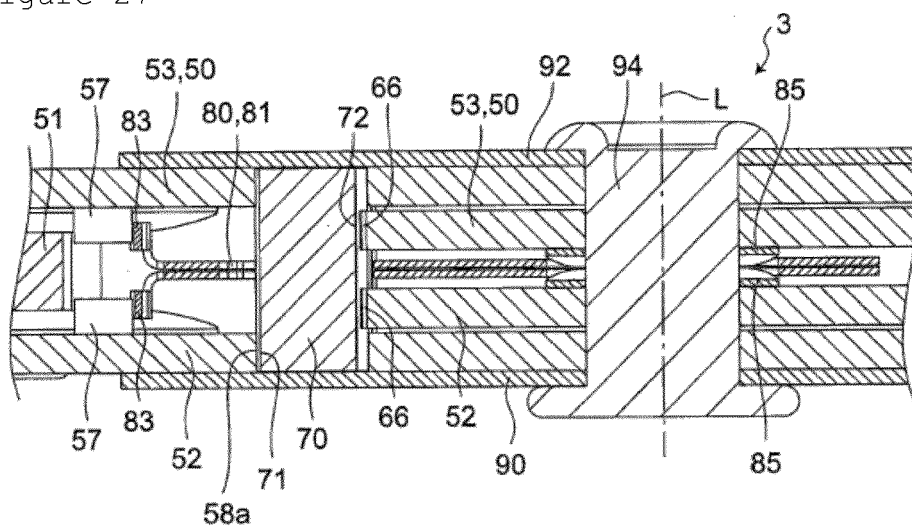


Figure 28

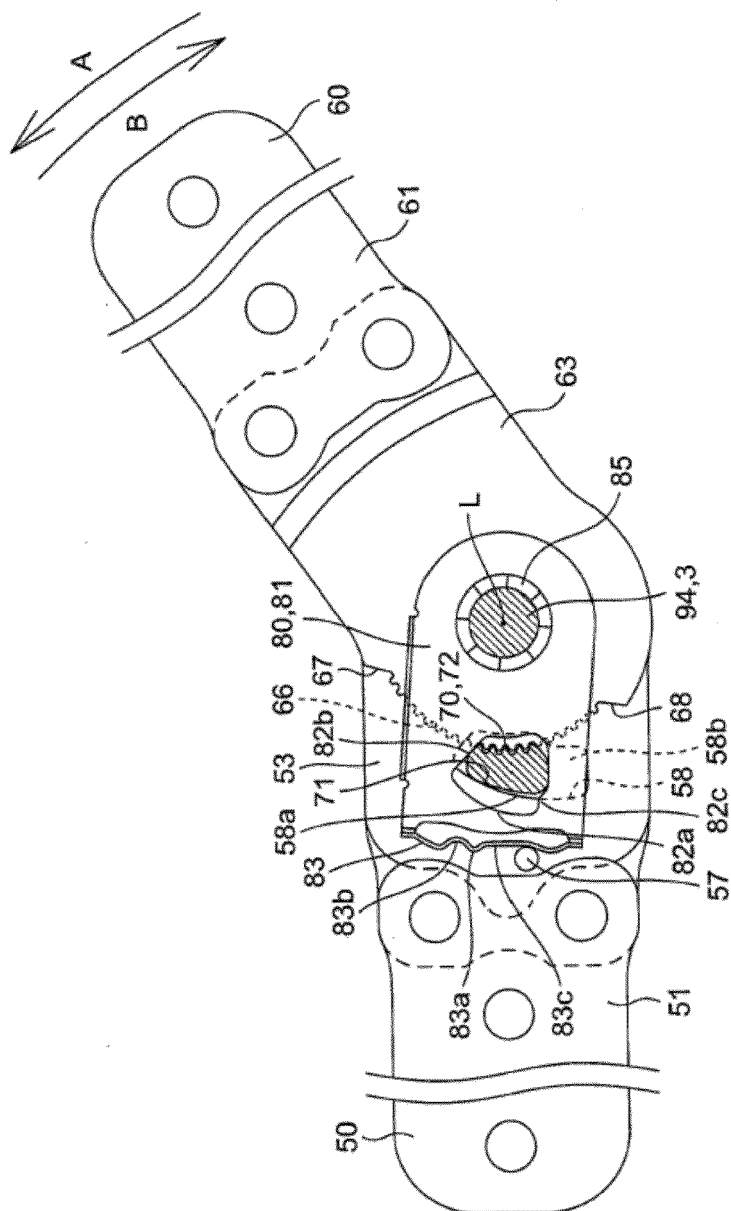


Figure 29

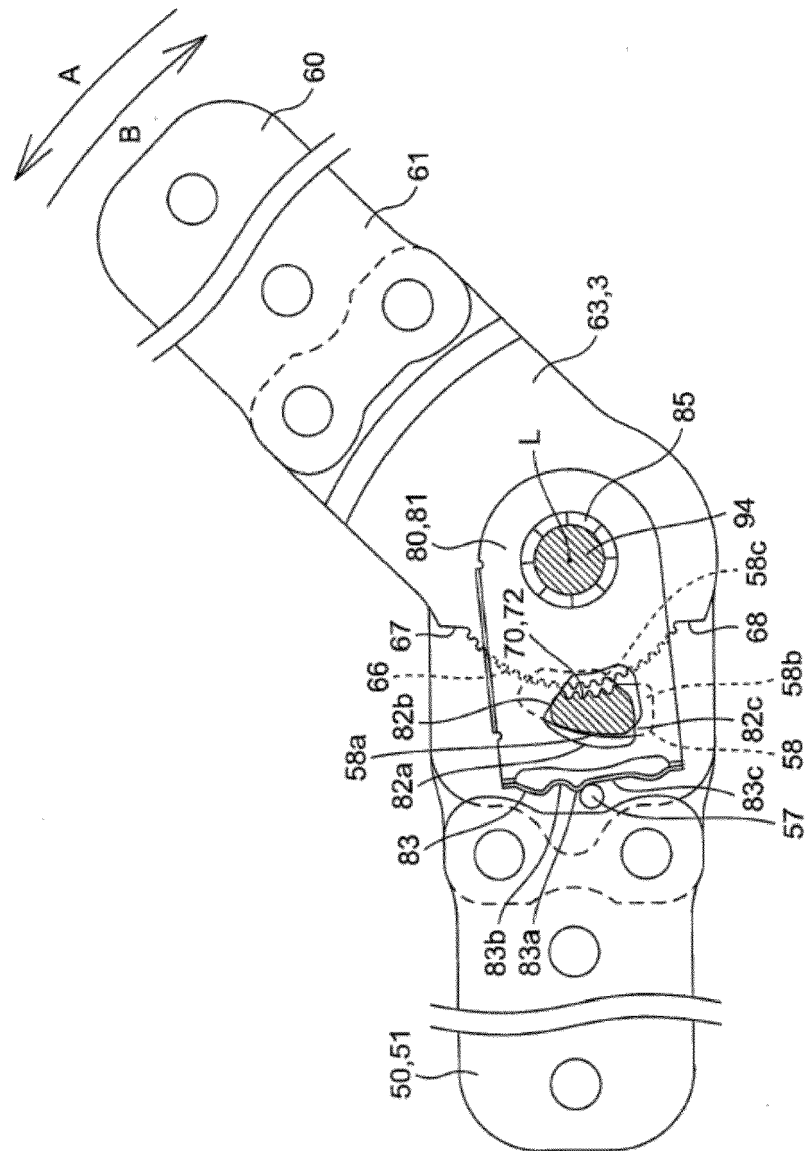


Figure 30

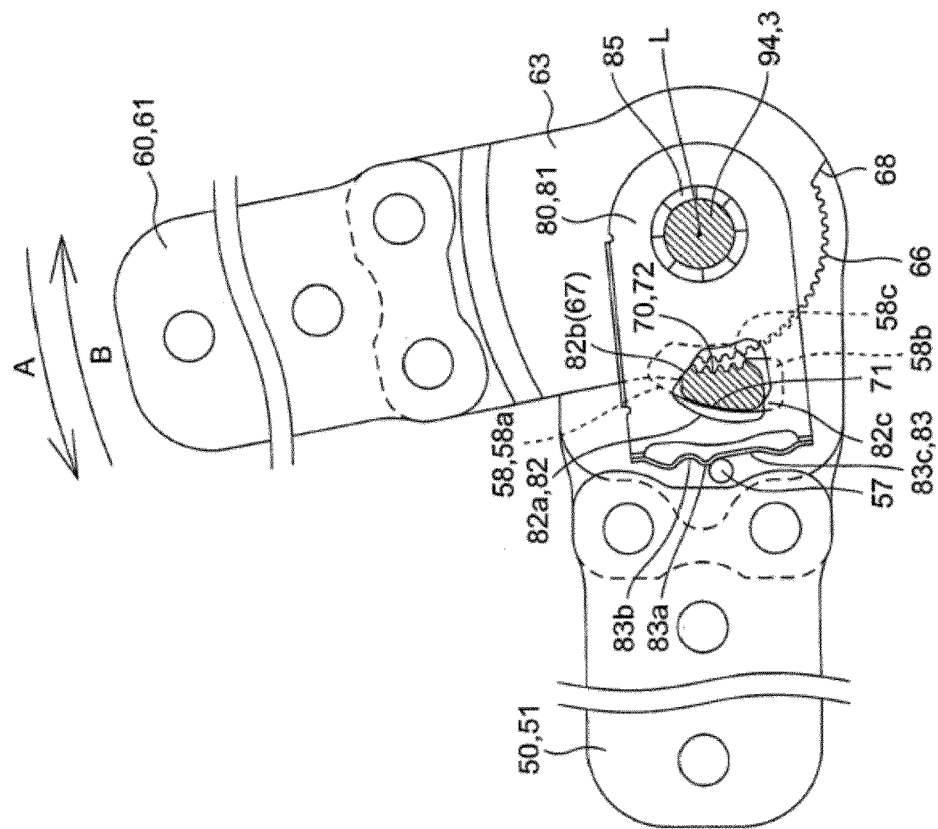


Figure 31

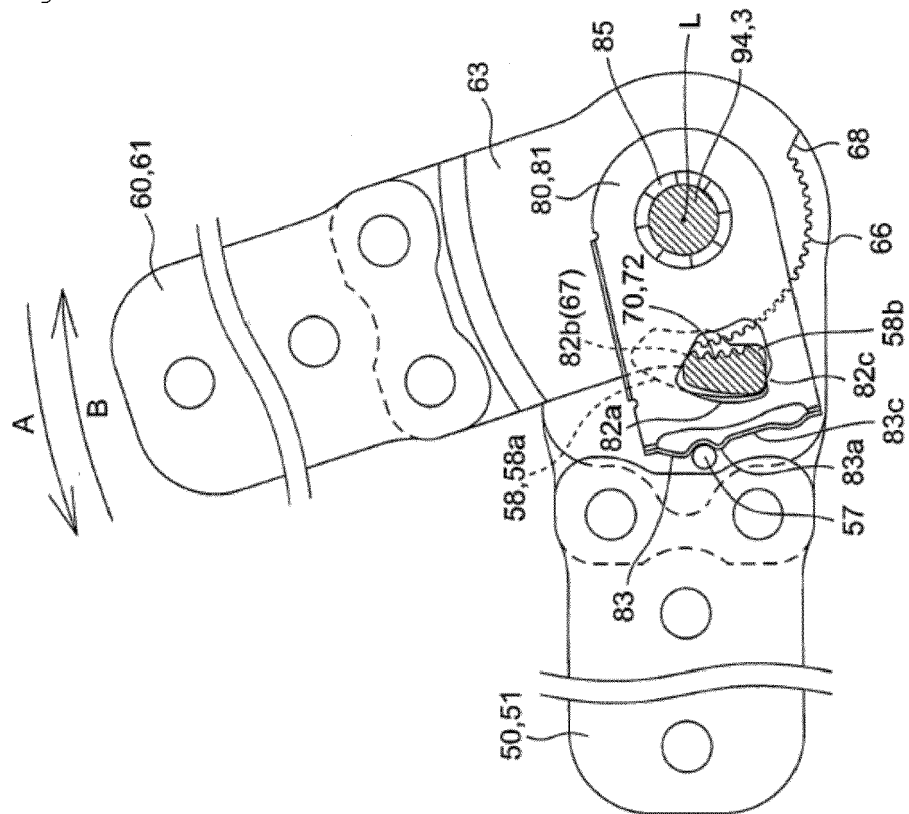
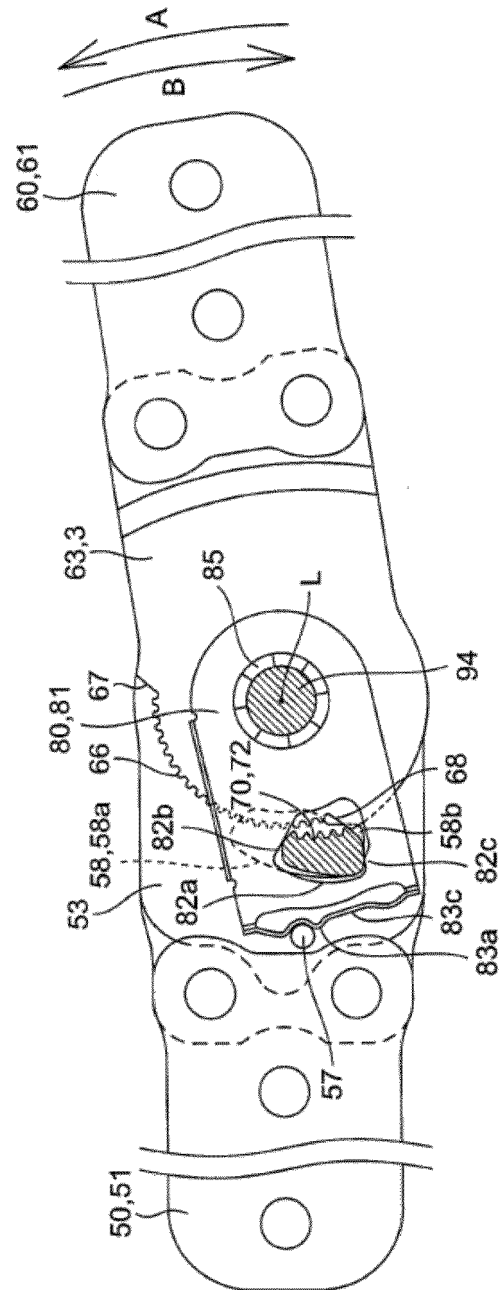


Figure 32





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Place of search The Hague		Date of completion of the search 7 July 2016	Examiner Sainz Martínez, M
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